Cognition and Musical Improvisation in Individual and Group Contexts

By

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Abstract

The aims of this research are to investigate how improvisatory skills develop in individuals and teams. It focuses upon the effect of musical expertise in different musical genres on the development of improvisatory skills. Multi methods were applied in the research and classified into four phases. The first phase involved a self-case study implementing deliberate self regulated practice based on a planned sequential model; a) sight-reading; b) memorising; and c) improvising; over 8 weeks in a trained classical musician. Additionally, the self-case study used two commissioned musical compositions matched in length, harmony and structure, one in the classical genre the other in jazz. In the 2nd phase, semi-structured interviews were conducted with novice and expert improvisers. The final phases included experiments studying sight-reading, memorising and improvising as a duo and observations and interviews relating to ensemble rehearsals and improvisation with cross genre compositions. The findings suggest that learning to improvise is frustrating and anxiety provoking. Seven elements were found to be important in acquiring musical skills and domain knowledge acquisition: physiological adaptation and developing reading music skills; establishing auditory schemata; automaticity; use of memorisation strategies; analytic strategy application; and improvising to a coherent musical structure. The findings also show that sight-reading and improvising share similarities in their characteristics when learning to improvise as a duo. Issues such as communicating to the audience, performance identity and connecting to the context are essential in the duo improvisation performance. The findings indicate that a 'concept of break-points' (Poole, 1983) take place during the latter stage of the ensemble improvisation process where changes occur across all three elements, *musical structure, social structure* and *communicative behavior.* (Bastien and Hostager, 2002:21) Factors such as leadership, group member characteristic, resource,

information flow, the creative environment and collateral structure can influence the quality of group improvisation performance.

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I would like to dedicate this thesis to Professor Graham F Welch and Professor Susan Hallam

Declaration

I declare the originality of this thesis and it contains 66,339 words, exclusive of appendices, list of references and bibliographies.

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CHAPTER ONE:

INTRODUCTION

A recent article entitled 'Piano mania' from Mainland China described how young Chinese children had been 'drafted early into the service of the family' (Daily Telegraph, 27th May 2007). It was reported that Chinese families had invested heavily financially, as well as sacrificing their time, in nurturing their children's musical potential. Two accounts in this report were particularly vivid. The first one was about a father who commuted hundreds of kilometres to further his son's music education every weekend. The second account was about a young girl in her early twenties who divided her time between New York and Shenzhen in order to compete in piano competitions.

These stories reminded me of my childhood and adult life. In my mind, Taipei in the 1970s somehow was a mirror image of today's China. The economy was booming. Families in Taiwan began to be able to afford to pay for extra curricula tuition, such as piano and violin lessons and my family was one of them. One day, when I was four years old, my mother took me to a big store full of what seemed like huge black and white box-like machines that produced sounds. She took my hand and encouraged me to touch one of them. To my delight there were sounds coming from this huge black

object. My mother then said 'Would you like to learn to play one of these?' I replied 'Ok', without really knowing what the long-term implications would be for my life. This then was the start of my musical life, having private piano tuition and group music theory teaching with a Yamaha school once every week and daily piano practice for at least two hours everyday. Since the age of four, the amount of time I have spent on practising the piano and learning related music skills has been at least 16 hours per week. When I was about to enter Junior High school at the age of 13, my mother decided that it would be good for me to try to pass the entrance examinations for a secondary music specialist school. One needed to pass a music theory examination (ABRSM grade 8 standard) and undertake a one-hour recital using one's first and second instrument. The minimum requirement for the recital programme for the first instrument was either a Beethoven sonata or a Mozart early piano concerto and one piece by either Chopin or Liszt.

In those years between the ages of 13 to 15, the total time I spent on practising the piano increased up to as much as eight hours per day. Unfortunately, I failed to pass the entrance exam for entry into the secondary specialist music school in Taipei, as well as not obtaining high enough marks in the national entrance exam to enter a good non-specialist secondary school. My parents' desire to ensure that I would be able to receive the best education in order to compete in the real world, led to them sending me abroad to England. I began to practise the piano intensively again, as well as acquiring musical knowledge when preparing for the English school system 'A' level stage of Music. I spent an average of between 27 and 38 hours in practising the piano and learning music every week. This routine was carried into the conservatoire year at Trinity College of Music in London. However, in the final year of my first degree, the amount of time spent on practice increased to 56 hours per week, similar to my teenage years. Overall, up to the age of 23, I estimate that I had spent approximately 27,000 hours in practising the piano and music learning.

Therefore, one could understand the level of frustration that I experienced when I found out that I could not obtain a job in London after graduating from Trinity College of Music because I had limited transferable improvisatory keyboard skills, such as improvising for a dance company, or becoming a music therapist, improvising for a musical theatre or even jamming in a traditional English pub. This real life dilemma inspired me to embark on this study.

1.1 Improvisation in Traditional European Music

Singing improvisation was reported to be a feature of the early practice of Gregorian chanting and of polyphony (Bailey, 1980). This custom of writing out an improvised, florid musical performance is also evidenced in keyboard music of the Baroque period. In addition, the Seventeenth century school of organ music was developed out of improvisatory performance practice, as well as accompaniment in opera and in concerted chamber music. In the case of the latter, a figured bass was provided for musicians to produce improvised counterpoint (Palisca, 1991). More recently, there are contemporary reports of distinguished composer-performers, such as Liszt and Mozart (Whitmore, 1991), using improvisation to demonstrate their advanced musicianship. In particular, the earliest documentation in relation to improvisation-focused concerts with solo playing was demonstrated in the organ school of teaching (Nielsen & Kvale, 2000). During the seventeenth century in Europe, solo improvising on string and keyboard instruments was popular and also attained a high pre-eminence. In general, however with few exceptions, such as classical guitar and organ, improvisation appears to have become relatively rare in the classical music performance repertoire of today.

1.2 Non-Classical Music Improvisations

This relative absence of musical improvisation in Western classical music is in contrast to high art music forms elsewhere in the world, such as South East Asia and the Indian sub continent (e.g. raga) and sub Saharan Africa (e.g. Ghanaian drumming). For

instance, in the Hindustani region, a heavy emphasis is placed on improvisation that embodies experimental performance, tolerance of change, and an interest in development (Bailey, 1980). There is a rich history of four thousand years behind the raga. In Indian musical culture, the improviser has enormous practical freedom as improvisation has been perceived as a musical life (ibid). In addition, improvisation is central to many non-classical musical genres, such as jazz and rock, perhaps this is because much of the learning in these musics has been informal and is not related to notation (Green, 2001). Arguably, classical Western music has developed with an emphasis on notation and orchestral playing reducing the requirement for improvisation.

1.3 Improvisation in British Music Education

1.3.1 Pre-School

There is a high expectation in the 'music' (sound) curriculum for play, exploration, and creativity in the early years in the English primary school context. In the statutory curriculum, there is an expectation in official documentation of the implementation of improvisation as part of creative learning (Early Learning Goals for the Foundation Stage in English National Curriculum for Music, 2008). In reality, OFSTED reports have consistently focused on the relative 'lack' of creative music opportunities in nurseries and schools (Welch, 2001). The early years' curriculum in Western culture has had a bias towards play, exploration, and creativity in general, probably derived from the writings of Rousseau in the Eighteenth century and echoed in the following work of Froebel, Montessori and Susan Isaacs. In the current English National Curriculum, for instance, the aims of the themes from Key Stages 1, 2, and 3 (covering the ages 5 to 14) are that the implementation of play, exploration and creativity (improvising) is the foundation of learning mastery. This is captured in some non-musical subjects such as Art and Design and English. The relative absence of improvisatory skills in traditional classical keyboard tuition may be linked to a bias in higher education and ABRSM instrumental curricula, which focus on mastery of the 'canon'. In contrast,

improvisation may be understood as making creative patterns in sound and is a characteristic of the earliest musical behaviour in young children (e.g., Welch, 2006).

1.3.2 Improvisation in the Classroom

There are benefits reported for improvisatory learning in formal music education. Improvisation in education is different from the professional setting because its rules are flexible which makes it very accessible to all levels of students. Very young children can improvise songs (Dowling, 1988) and enjoy free improvisation (Azzara, 2002). At pre-school, during children's improvisations, they explore tone, timbre, and rhythmic patterns using a steady beat and asymmetrical patterns in order to make sensory-motor connections between the structure of their activities and sound qualities (Mialaret, 1994). Older children choose a greater variety of rhythm patterns (Reinhardt, 1990). As the children grow older, they are able to improvise using related musical and verbal stimuli. In doing so, the tonal orientation and structure are developed in the improvisation (Moorhead and Pond, 1978; Flohr, 1985).

Brophy (1999) found developmental trends in rhythmic and structural dimensions in improvisation performances, but not for the melodic dimension in older children, aged 6-12 years. As the age of children increased, improvisation involved a more formally organized content, the usage of more rhythm; i.e. patterns and development of motif. Between the ages of 6 and 9 years, these changes were reported to be particularly strong (Brophy, op. cit.). Between 9 and 11 years, this seemed to reach a plateau, but it resumed again at the age of 12 years. The style of improvisation made by children reflected the musical culture that they had been brought up in and also the musical experience of the teacher (Kalmer and Balasko, 1978). Freundlich (1978), for example, demonstrated that fifth grade children were able to produce authentic musical ideas without notation within the framework of a 12 bar blues. There is evidence that formal instruction in the classroom also makes a positive impact in developing improvisation skills, particularly those relating to harmonic content (Ott, 1996; Laczo, 1981).

However, in secondary school music education, it is often difficult to distinguish between composing and improvising as separate musical learning components. For instance, improvising has been defined as 'playing or singing with little or no preparation, inventing the music, in whole or in part, as it progresses' (NAME, 2000:8). Similarly, composing is stated as 'greater preparation...the fixing of ideas, refining, changing and thinking through ideas...' (Ibid). Even the status of learning and developing musical improvisation has been introduced as a substitute for composing.

1.4 The Benefits of Learning to Improvise

Learning to improvise is reported to be valuable for many reasons. For instance, the skills acquired during learning to improvise can provide students with a clearer understanding of music performed with notation (Azzara, 1992; McPherson, 1993). It has been found that the improvising of particular rhythms can improve rhythmic accuracy in sight-reading achievement amongst groups of elementary college students compared to a control group (Montano, 1983). Elementary students who received instrumental music tuition, including improvisation, performed much better than controls on études (Azzara, 1992). Wilson (1971) also found that students with improvising experience made greater advancements than those in control groups in aural recognition of melodic and rhythmic elements, idioms and sight-reading.

Additionally, several personal and social benefits can result from group improvisation. Students who have suffered from anxiety in making solo performances found that playing in group improvisations and making rhythmic embellishments of familiar tunes helped them to deal with their concern. Keen improvisers also made meaningful friendships with each other (Leavell, 1997). Group improvisation can reduce performance stress and can help musicians raise issues relating to performance anxiety through experience, in a safe and familiar environment. This can reduce stress through creative activity and benefits in forming a good community spirit (Montello, 1990).

1.5 Aims and Research Questions

The purpose of this research is to investigate what happens when musicians are asked to improvise, taking account of their experience and expertise in improvisation. Differences and similarities in their formal and informal musical education related to learning to improvise are also explored. There are two assumptions surrounding the art of improvisation. The first deals with the definition of improvisation concerning the implications of its perceived rules and whether improvisatory knowledge is pre- learned or spontaneous and to what extent a particular musical genre dictates and influences the nature of improvisation. The second focuses on the development of skills and knowledge involved in learning to improvise, i.e. does a learner need pre knowledge and skill acquisition to improvise to a high level?

One element of my research aims to make explicit any similarities and differences in 'how we think we do it' and 'what we actually do' during the process of learning to improvise. It, therefore, examines the psychological elements within the human bodymind (Thurman and Welch, 2000); in thinking, feeling and doing during the improvisatory process. The body of literature considered consists of a crossover overview combining theories and practices from cognitive science, psychology of music and music education relating to learning to improvise. The methodology includes both qualitative and quantitative approaches drawn from those adopted in the literature.

The research explores the potential benefits of spontaneous musical creativity as an essential feature of learning in music, seeks to raise awareness of possible diverse approaches in learning to improvise and last, but not least seeks to clarify any fundamental problems which educators can address. I started my research from personal introspection and subsequently employed a multi-methods approach to investigate individual behaviours and group activities.

My main research question is:

How are improvisatory skills developed in individuals and teams?

Subordinate questions are:

What strategies do expert and novice improvisers use when learning to improvise?
What factors influence the development of strategies and skills in learning to improvise?
What are the relationships between memory and learning to improvise?
What effect does expertise in a different musical genre have on these developing skills?

Possible answers to these research questions are to be found in the chapters that follow. Chapter Two examines theoretical frameworks of creative cognition in developing improvisatory skills in individuals and teams. Chapter Three explores the literature on the development of musical expertise in learning to improvise. Chapter Four explains the research methodology in detail. This is followed by Chapters Five, Six, Seven and Eight that present findings from a series of empirical studies. Chapter nine offers a discussion of the main findings in relation to key literature sources and presents implications for performers, teachers and course designers.

CHAPTER TWO:

COGNITION AND MUSICAL IMPROVISATION IN INDIVIDUAL AND GROUP CONTEXTS

2.1 Introduction

This chapter focuses on theoretical frameworks of creative cognition in developing improvisatory skills in individuals and teams. In particular, the narrative investigates and critiques the ideologies of improvisation in relation to Western classical and jazz genres, as well as the development of improvisatory activities in other domains such as drama and business. It begins to address the subordinate research questions from a literature perspective, such as in what ways improvisation skills might or might not be genre specific and the effect of expertise in a particular musical genre on these developing improvisatory skills. As there is limited existing research concerning musical improvisation in the context of a group, the narrative draws also on interdisciplinary organizational improvisation theories based on business and group jazz performance as part of the theoretical background. In addition, the chapter applies the multi-sequential model (Bastien and Hostager, 2002) – 'musical structure', 'social structure' and 'communicative behaviour' – based on Poole's (1983) theory, to address and analyse the

possible cognitive relationships between the process and the product in group music improvisation.

Creative cognition in musical improvisation is believed to include: internalisation in long term memory; the capacity of working memory; and the simulation of automatic and cognitive processes. For instance, one way that expert jazz improvisers are reported to develop their improvising skills and knowledge is by learning solos recorded by the masters from older generations until they can imitate these note by note (see 2.3.2). Such learning is then theorised as being transferred and internalised as a reference source in long-term memory. Specifically, the chapter will draw on the theoretical aspects of the 'Geneplore model' (Finke et al, 1992) to identify improvisational knowledge which has both an exploratory and generative nature.

2.2 The Characteristics in Musically Creative Individuals

Although the differences between composition and improvisation are more obvious in real world music practice than in formal music education, there are believed to be many similarities in characteristics between expert composers and improvisers (Simonton, 1997), including the opportunity to engage with music, the amount of time that each individual has devoted to musical activity, extensive knowledge of music and a shared deep commitment to their work. Musical improvisatory activities have been included under the norms of music creativity (ibid).

Studies have shown that, in the development of jazz improvisation skills in students, there seemed to be strong correlations between vocal jazz improvisation, knowledge of jazz theory, imitative ability, prior ensemble experience, jazz experience, and the length of time in having instrumental lessons. All the elements indicate the importance of time and effort in engaging with jazz related activities as predictors of levels of attainment (Coy, 1990; Greennagel, 1995), as well as impacting on musical identity and motivation. Similarly, Simonton (1997) comments that eminent composers began

composing at very young ages and continued to develop their writing throughout their lives. Commitment and time invested in musical activities are seen to be significant in developing high levels of expertise (Ericsson, 2004).

Considering the personality traits of musicians, Kemp (1996) found that musicians have certain personality traits in common, such as introversion, independence, sensitivity and imagination, and radicalism. Composers are reported to have these characteristics in more extreme versions than other musicians. Studies of composers' lives have shown strong evidence of these findings and suggest that they tend to be individualistic, have a capacity for solitude, and are attracted to complex and ambiguous symbolic enterprises. They are also highly motivated. Even though the range of characteristics and experiences attributed to creative individuals are broad and varied, there is still insufficient clarity to enable the unambiguous identification of highly creative individuals in childhood.

2.2.1 Creative Processes in Music

Composition, improvisation and interpretation of music may be able to be seen as part of musical creativity. Sternberg (1988) outlines how theories of creativity have adopted a range of perspectives considering the process, the individual, the environments and creative products. The promotion of creativity has seemed to be significant and worthwhile; however, research on creative processes in music is fairly limited and there is also some controversy on the ideology relating to different levels of creativity. For instance, looking from the perspectives of the structure of the end product and the scale of endeavour, composing has been seen as the highest level, whereas interpretation is at a lower level of creativity. The distinction between composition and improvisation is fairly clear in professional music practice, whereas in music education the boundaries are often blurred, due to the changing conceptions of composition (Hallam, 2005).

2.3 Background to Improvisation

In the business world, improvisation has been implemented in various training courses. Trainees have used role playing in organizationally-based improvisations in the belief that this will help to find solutions and to anticipate new environmental challenges, particularly in the field of transaction cost economics (Williamson, 1979), institutional theory (Meyer and Rowan, 1977) and a resource-based view of the firm (Barney, 1991; Grant, 1991). Additionally, researchers have looked into jazz for the development of organization theories. For instance, Weick (1992) investigated and recognized a jazz band as a prototype organization. Barrett (2002) believed that jazz improvisation can help to develop learning and innovation in organizations and that the behaviour of jazz musicians can offer a useful framework for managerial action.

The notion of improvisation has often been linked with planning as a first stage, followed by implementation. Weick (1993a) comments that the time gap between planning and implementation during the process of improvisation narrows, therefore composition generates from execution. The more flexible the design and execution of an activity in time, the more improvisational the activity is (Moorman and Miner, 1998a). Several bodies of literature support this definition of improvisation. For instance, improvisation is described as "thinking in the midst of action" in education (Irby, 1992:630) and it takes place when " acts of composing and performing are inseparable" in communication (Bastien and Hostager, 1992:95). It is also referred to as "reading and reacting in parallel" in sports psychology (Bjurwill, 1993:1383), "real-time composition" (Pressing, 1998:142) and "making decisions affecting the composition of music during its performance" (Solomon, 1986:226) in music, and "no split between design and production" in organizational studies (Weick, 1993a: 6).

2.3.1 The Process of Musical Improvisation

Improvisations in jazz and some world music traditions are rule governed, providing constraints for the musicians, as for instance in jazz related to a specific song, the

harmonic structure and characteristic rhythmic patterns (Pressing, 1998). These consequently draw a boundary around the musicians' creative choices, whilst giving the musicians a licence to operate between several available and appropriate alternatives. Pressing (1998) suggests that the process of improvisation depends on long-term memory extensively and the simulated activations of unconscious automatic processes with conscious cognitive processes.

Johnson-Laird (1988) believes that, in order to be able to improvise effectively in a particular genre, the subconscious knowledge base processes need to be automated so that the performer can access these at the moment of creation. If the knowledge base is effectively internalised in long-term memory from sufficient practice and performance experience, the resources used to create surface melody are free to concentrate on developing coherent and structural unity. The improviser must have sufficient motor programmes to have access to patterns and sequences from style specific knowledge. Schramoski (1973:239) describes the programme that improvisers use as being based on 'movement images'. The nature of the movement sequence is structured from particular notes imposed by the physical constraint of the instrument.

Johnson-Laird (1991; 2002) comments that, at the deepest level, improvisers activate basic structures in memory, at a middle level they make feedback decisions in relation to the structure of the referent, and at the surface level improvised melody is produced. Once the improvisers become more experienced, more complex actions involved during the process of improvising become automated. However, in the early stages of learning to improvise, more simple processes through the application of short-term memory can produce acceptable improvisation of a more mechanical nature (Johnson-Laird, 1988). Processes such as feedback generate new ideas through ongoing monitoring of performance, allowing some initial unintended wrong notes to become incorporated intentionally subsequently into future performance (Kenny and Gellrich, 2002). In addition, an important part of creativity and improvisation is believed to be

the interaction with fellow musicians, the audience and environment, which are seen to make each improvisatory performance distinctive (Johnson-Laird, 1991).

2.3.2 The Development of Improvisation Skills

Regarding learning to improvise, jazz musicians of the highest level of skill and reputation seem to develop their improvising skills by learning example solos of the masters from older generations (Beliner, 1994; Kernfeld, 1995; Owens, 1995). They practise such solos until these can be imitated note by note. These then subsequently become the basic forms of reference for the development of related abilities in order to push the limits of what musicians have learned into the creation of new music. This new music has elements that are similar in characteristics to the imitated models that the musicians have internalized. Often, it is reported that one can identify the source of the influences. However, sometimes the developments are reported to happen in dramatic and radical ways (Weisberg, 1999).

Owen's (1995) analysis of recorded Charlie Parker's solos from 1920 to 1955 reported that the skills and knowledge that Parker displayed during his performance career were at an exceptionally high level. At the same time, he was also reported to be extremely disciplined about the creative quality of his solos, as he was found to never repeat himself. However, Charlie Parker was systematic in improvising his solos. He had created collections of patterns, i.e. two-three note clusters, long passages of a dozen notes, which appeared in most of his solos. The development of Charlie Parker's improvising skills can be understood in several ways. It was reported that, between the shows in a nightclub dressing room, he was playing solos of other great musicians such as Lester Young. As well as imitating and memorizing fluently other people's solos, Parker also was knowledgeable about the style of improvising in jazz in his time that he learned from his peers. Last, but not least, the development of his distinguished style in improvising solos was carried out through regular practice and playing sessions (Weisberg, 1999).

Johnson-Laird (1988) developed a computerised model of jazz improvisation, based on the imitation approaches of jazz musicians, where the musicians themselves had to acquire sufficient skills in order to imitate and improvise in real time. The strategies or principles that the improvisers adopted were to select notes to be played during the improvisatory performance. Johnson-Laird (1988) comments further that the reasons behind the selection of notes during the process of improvising were first to see these as fitting within the harmonic language and rules, and secondly to add interest in the improvised solos.

A number of studies have been undertaken on the differences between expert and novice improvisers (e.g. Kratus, 1991; Hargreaves et al., 1991). The ability of knowing how a melody will sound before it is played on an instrument is reported as being essential in the development of expertise among improvisers. It has been marked as an ability to create a mental image of the sound through 'audiation' (Gordon, 1993). Other skills which expert improvisers develop are reported to include:

- The skill to internalize music in a short space of time during real-time improvisatory performance;
- Sufficient knowledge in analysing musical structures;
- The skill to manipulate an instrument or the voice to achieve musical intentions convincingly and fluently;
- Sufficient knowledge of strategies for formulating an improvisation and the flexibility to change strategies if necessary;
- Sufficient knowledge of stylistic conventions for improvising;
- The skill to transform the stylistic convention to the development of a personal style (Kratus, 1991).

The development of expertise in musical improvising is believed to involve a series of stages (Kratus, op.cit.). In Stage 1, the learner develops their skills through explorations in their playing. Stage 2 is focused on process, i.e. musical doodling without any overall structure. Stage 3 is about product-oriented improvisation where the learner will

incorporate musical techniques into the playing. During Stage 4, the learner is seen to become more fluid in producing improvisation and executes more controls on the technical aspects of performance. At Stage 5, the nature of the improvisation becomes more structured. In Stage 6, the learner develops their personal style in improvisation as well as being fluent in improvisation and in adopting appropriate musical styles (Hallam, 2005).

Sudnow (1978) reported that acquiring jazz improvisation skills as an adult professional classical musician was tedious, effortful and frustrating. During his learning to improvise, he had difficulties in acquiring knowledge from aural sources, applying the technical constraints imposed by particular instruments, which impacted on the improvised response and in recognizing the differences between spontaneously created material and improvised fillers. Sudnow (1978) also documented one of his more successful strategies in learning to improvise. As the development of his skill progressed, he developed a strategy called 'frantic playing' for applying the internalized knowledge. In order to achieve this, Sudnow reports that he had to give up cognitive control and let his hands find the notes instead.

This risk taking strategy led to a sense of more 'right' notes and Sudnow's improvisation started to sound more like an experienced improviser. Performances which consist of flow states (Csikszentmihalyi, 1991) and risk taking could hold the key in achieving optimal levels of musical communication in improvisation. Berliner (1994) comments on the attainment of this level of performance as being 'within the groove' (Berliner, 1994:389). In some performances when improvisers experience peak experience or flow states (Csikzentmihalyi & Rich, 1997), it assists and motivates them to move beyond their own earlier cognitive limits. There are several significant factors reported in facilitating the development of improvising skills, including creativity in early musical environments, assisting jazz communities as part of an education system, developing jazz languages and repertoire, encouraging musical interactions, musical

conversations, understanding jazz as a way of life, thinking about jazz, making music in real time (Berliner, 1994) and commitment (Sudnow, 1978).

2.4 Improvising as a Group Activity

2.4.1 Organization Improvisation

Three characteristic constructs have been identified as being present in defining organizational improvisation. Improvisation is "deliberate" (Miner et al, 1996), "extemporaneous" (Weick, 1990; Crossan and Sorrenti, 1997; Mintzberg and McHugh, 1985; Perry, 1991) and "occurs during action" (Miner et al, 1996). Improvisation is also a 'bricolage' (something created from a diverse range of things). Improvisation is performed with available and optimal resources during the temporal coincidence of planning and executing improvisational actions. Members of the organization must acquire deep knowledge of these resources and the experiences of adopting and combining them (Weick, 1993a). In the jazz music tradition, these resources are seen to draw from songs, instrumental playing and the affective mood of the group.

Other categories of resources such as material, cognitive, affective and social are available for improvisation in general. Material resources generally exist apart from the individual and the organizational social systems. For instance, resources such as information systems, financial resources and buildings have been referred to in the material category (Cunha et al, 2002). Cognitive resources are seen to consist of the set of mental models generated by the individual members of the organization. These mental models can be of an explicit or tacit nature and might have been developed both inside and outside the organization (Argyis and Schon, 1992). Especially in group theory, there is a consideration of activities occurring in real time (Harvey, 1996; Janis, 1971). Affective resources are believed to be significant in improvisation, but limited related studies have been undertaken in this area. Eisenberg (1990) argues that improvisers could experience an emotional state of transcendence and interconnectedness during performance without "prior interaction and self-disclosure"

(Cunha et al, 2002:107). Theorists of group behaviour also argue that an appropriate emotional state can help to avoid group deviation (Harvey, 1996; Janis, 1971; Senge, 1990). Hatch (1997) believed that it was necessary for group improvisers to be in a specified emotional state, such as "the groove" (Cunha et al, 2002:107) during the process of improvisatory performance. The social resources of group improvisation include formal relationships, explicit and tacit rules and informal interaction (ibid). In jazz, the knowledge and embodiment of the social resources could occur outside the organization. For example, the acquisition of instrumental playing skills is through professional training. Hence, the structures in the domain of jazz emphasize individual experiences within organizational teamwork and are believed to be linked closely to the development of "swift trust" (Jarvenpaa and Shaw, 1998).

2.4.2 Group Improvising in Music and Drama

In Monson's (1996) report on studies of how jazz musicians collaborate, he suggested that musical communication in jazz depends on all of the musicians knowing the 'language' extremely well. For example, musicians seemed to understand the common musical language spoken during group creativity:

> "But you see what happens is, a lot of times when you get into a musical conversation, one person in the group will state an idea or the beginning of an idea and another person will complete the ideas or their interpretation of the same idea, how they hear it. So the conversation happens in fragments and comes from different parts, different voices" (op.cit.78).

Such a group flow of musical ideas is seen as being one of the ultimate highlights in musicians' performance lives (op.cit.80). Berliner (1994) also reports a similar phenomenon of experiences from jazz musicians:

> " ...Rather than develop their own musical ideas or starting a completely new idea, each musicians continues in the spirit or mood established by the prior players, responding to, and building on, the prior musician's eight bars" (Berliner, 1994: 369-70).

It has been demonstrated that the process of group creativity in jazz allows musicians constantly to develop their creativity by elaborating on prior ideas.

Similarly, group improvisation performances in dramatic art have an underlying structure. Bakhtin (1981), for example, commented that the words that individuals tried to express had connotations with past situations of use. Researchers of linguistics suggest that 90 percent of all of our spoken language is partially indexical (Bar-Hillel, 1954). It is important for actors to believe that they share common cultural knowledge with their audiences. Therefore, actors can converse using improvised language whilst having both explicit and implicit communication with the audience. For instance, improvising actors may use pop-culture references to communicate with their fellow actors and audience. There are two general forms of structure reported in dramatic ensemble improvisation: scenarios and formulaic speech. The nature of these two improvisational structures also has parallels with the structures and motifs on which musical improvisation is based.

2.4.3 Group Improvising in Business

Organization and creativity are two essential elements in improvisation within a group context. The nature of the organization is believed to influence the development of creativity. For example, in business, a more traditional view of organizational creativity addressed the relative presence of spontaneity in interpersonal relationships in the organization and offered models in rational thinking and decision-making. It aimed to reduce uncertainty by implanting a model of routine (Williams and Yang, 1999); but, ultimately, discovered that "control has had the effect of minimizing employee creativity" (op.cit: 374). Early works of Smith (1776) and Weber (1922/1996) suggested that rigid adherence to rules and regulations appear to encourage logical thinking rather than creativity. However, the concept of creativity has been emphasised in today's business world, as workers are often seen to be required to adapt quickly between different specialised tasks. Hunter and Schmidt (in press) have pointed out that:

> "Currently, product life cycles are much shorter than worker life cycles – most manufactured products now undergo fundamental redesign in 5 to 10 years (6 to 12 months in high technology industries). This means that workers must abandon old strategies and learn new ones that are often incompatible." (op.cit: 5)

2.5 Characteristics of Group Jazz Improvisation

Barrett (2002:139) outlined the key characteristics of jazz improvisation as follows:

- Provocative competence;
- Deliberate efforts to interrupt habit patterns;
- Embracing errors as a source of learning;
- Shared orientation toward minimal structures that allow maximum flexibility;
- Distributed tasks: continual negotiation and dialogue toward dynamic synchronisation;
- Reliance on retrospective sense making;
- "Hanging out": Membership in a community of practice;
- Taking turns soloing and supporting.

Professional jazz players will take risks to create new ideas by breaking away from their comfort zone. Some may avoid relying on pre-arranged music or memorized solos. The famous jazz pianist Keith Jarrret believed that "the music is struggle; you have to want to struggle. And what most leaders are the victims of is the freedom, not to struggle. And then that's the end of it. Forget it!" (Carr, 1991:53). Many professional jazz musicians are believed to practise 'provocative competence' and by doing so, they hope to achieve novel responses in their musical creativity (Barrett, op.cit.). In jazz, errors are seen as a source of positive learning. The musicians embrace their mistakes and incorporate these into their music. As Max Roach commented "If two players make mistakes and end up in the wrong place at the wrong time, they may be able to break out of it and get into something else they might not have discovered otherwise' (Berliner, 1994:383).

Hedberg and colleagues (1976) suggest that organizational processes would be improved if designers encouraged minimal structures to encourage diversity in creative production. Further, Eisenberg (1990) investigated jamming in the jazz band and similarly found that creativity would be enhanced if a minimal structure were emphasised. The simplicity and accessibility of the minimal structures are seen to help to develop space and opportunities for optimal creativity. For instance, jazz improvisation may be based around songs that have patterns of melody and chord

changes of a minimal nature. Bastiena and Hostager (1988:585) saw songs as "cognitive held rules of musical innovation". These minimal constraints of songs allow musicians flexibility to express maximal diversity.

An important characteristic of jazz improvisation is seen to be the continuous creative negotiation between members in the group. Barrett (2002:150) stated, "Players are in a continual dialogue and exchange with one another". Musicians in the group innovate their musical statements in anticipation of others' expectations and by predicting how others might react, based on what has already happened (Barrett, 2002:151). Purser and Pasmore (1992:152) suggested that jazz bands are "flexible, self-designed systems that constantly strike the balance between order and disorder in dynamic synchronization".

Retrospective sense making is also an essential characteristic in jazz improvisation. Weick (1993) adopted Levi-Strauss's (1996) concept of bricolage in describing jazz improvisation as the art of making use of whatever is at hand. It is also significant in the process of learning to improvise in jazz that individuals become a member of its community. Gaining membership in communities of practice enables opportunities to learn to improvise. Learning with peers is believed to be as important as memorizing solos. Communities of practice are seen as informal systems for disseminating knowledge and experiences. In jazz, the practice of taking turns in soloing and supporting is an essential characteristic. A model of sharing leadership is developed, as well as the development of fellowship. Musicians need to anticipate themselves as individual virtuoso as well as enabling others to excel.

2.5.1 Related Constructs in Organizational Improvisation

Several related constructs in organizational improvisation are creativity, adaptation, innovation and learning (Cunha et al, 2002). Creativity within group improvisation has been referred to as "the creation of a valuable, useful new product, service, idea, procedure, or process by individuals working together in a complex social system" (Woodman et al, 1993:293). Creativity shares the element of novelty with

improvisation, but differs in terms of planning and it can be delayed for performing with optimal resources (Amabile, 1998). Some improvisation performance can produce absolute novelty in terms of creativity. However, the majority of improvisation can only be relatively novel, as the format might have been used previously (Moorman and Miner, 1998a). The construct adaptation involves adjustments to external conditions (Campbell, 1989). It can occur before the stage of implementation (Hamel and Prahalad, 1994; Hammer and Champy, 1993). Further, adaptation needs time to replace all the necessary resources when it is implemented (Von Clauzewitz, 1976). However, in some highly turbulent situations, adaptation could be limited to be improvisational as it was too late to respond efficiently to an external threat (Crossan et al, 1996; Perry, 1991).

Innovation is referred to as "the adoption of any device, system, process, problem, program, product or service that is new to the organization" (Dougherty, 1996:424). It focuses on relative novelty and also can be planned. Cooper (1979) supported such a definition by providing empirical evidence to show that innovation tends to perform better in the market. However, improvisation has been seen as an alternative model of organizational innovation. Due to the increasing changes in competitive landscapes, there is growing importance in innovation (Bettis and Hitt, 1995). The construct of learning in improvisation occurs "forgetting, concealing and silencing, hiding a new set of continuities and in their place creating new categories, different meaning and more organization" (Weick and Westley, 1996:456). In contrast, improvisation can happen with (Crossan and Sorrenti, 1997), or without learning (Weick and Westley, 1996). Further, learning can generate from planned scientific methods (Gower, 1997). The rate of learning can also be increased from the level of ability to improvise (Crossan and Sorrenti, 1997).

2.5.2 Conditions in Organizational Improvisation

The conditions for group improvisation are believed to be an experimental culture, a minimal structure and a low procedural memory (Cunha et al, 2002). An experimental

culture is seen to be about promoting action and experimentation. In order to achieve the notion of an experimental culture, the group tolerate error and embrace aesthetic forms of improvisation (Weick, 1999). The experimental culture in organizational improvisation has a strong belief in pro-innovation.

2.5.3 Factors influencing the quality of Organization Improvisation

Cunha and colleagues (2002:119-120) found several significant factors were likely to influence the quality of organisational improvisation;

- Leadership;
- Member characteristics;
- Information flow;
- Memory related factors;
- Organizational configuration;
- Resources.

Leadership is seen to be significant in affecting the quality of organizational improvisation. Researchers have referred to the style as a "servant" leadership style (Greenleaf, 1977) and as a rotating leadership (Bastien and Hostager, 1988; Weick, 1993b). The theory of a rotating leadership links to the increasing level of complexity and the interdisciplinary nature of the opportunities or problems that organization could potentially face (Stacey, 1995). This could mean that different competencies and knowledge are required at different times. Within group improvisation, the role of each individual member could constantly switch from being counsellor, the leader, or part of the supporting system. This might be caused by a shortage of time for action and a need for specialized knowledge (Stacey, 1996; Weick, 1993a).

The leadership style of the group's formal leader can also act as a moderator of improvisation (Cunha et al, 2002). A directive leader could have a negative impact on improvisation if he or she imposes visible and obtrusive control upon the group. The style of a 'servant' leadership could provide a positive impact on the effectiveness of organizational improvisation. It is conceptualised as holding stewardship for followers

and for the purposes of the organization (Greenleaf, 1979). Stewardship for followers has two advantages; first it limits the negative effects of practising improvisation (discussed in the next chapter) (Eisenberg, 1990) and also allows smoother transitions of real leadership.

In jazz, the characteristics of the group members seem to show that the level of performance experiences and musical skills that each individual has determines the ability to pursue improvisational activities (Crossan et al, 1996; Weick, 1993a; 1999). Further, it seems that group improvisational performance could be limited by the skills of the least able member (Bastien and Hostager, 1988; Hatch, 1999). The acquisition of musical skills and abilities can help the production of creativity.
Additionally, individual creativity is a significant trait in the development of improvisation (Crossan, 1998; Erickson, 1982). Weick (1998:545) argued that high levels of individual creativity could transform current organizational practice into 'purer' instances of improvisation, whereas the lower level only results in variations of the original idea. In addition, 'conditions of organizational improvisation' would allow the possibility in positive outcomes of individual creativity (Crossan and Sorrenti, 1997). Without the presence of these conditions, individual creativity could become a negative element (Amabile, 1998) that might trigger negative group phenomena 'groupthink' (Janis, 1971).

Diversity of group membership also can affect the degree and quality of group improvisation (Cunha et al, 2002). Homogeneous individuals and groups are not likely to encourage diversity (Hanna and Freeman, 1989) that could compromise the 'novel' element of organization improvisation. Therefore, it might consequently limit their potential for the production of improvisation to small variations that are based on current ideas, products, practices and routines (Hatch, 1997; Weick, 1998, 1999).

Another element of membership characteristics is the ability to manage explicit emotional states in both the group and improvisation performance context (Cunha et

al, 2002). The management of the state of an individual's performance anxiety is also crucial. Improvisation performers could experience quite a high level of anxiety due to the perception of working with no structure (Barrett, 1998; Hatch, 1999). This level of anxiety seems to need an explicit and effective treatment, as it can rarely be resolved implicitly (Kets de Vries and Miller, 1984). At the same time, it could reduce the gap between canonical and improvisational practice (Amabile, 1998; Eisenberg, 1990). Therefore, it could have a negative impact on the quality of improvisation. The ability to recognize and deal with the emotional state of performance positively is believed to be essential to the process of improvisational performance (Cunha et al, 2002).

Information flow is also one of the determining factors in the quality of improvisation. It is divided into categories of factors relating to the organization and its environment and the intra-organizational information flow (Cunha et al, 2002). Information flow is an essential factor in producing effective improvisation as it can act as the centre of communication within the organizational improvisation (Orlikowski, 1996). This communication is the effective link between individual and group performance within the organization (Bastien and Hostager, 1988). If there is no communication present during the performance, the improvisation could break into ineffective responses from within the group (Moorman and Miner, 1998a).
One of the important conditions in improvisation is that it needs to break away from current routine/knowledge at the same time as developing from it. Therefore, memory related factors are essential in developing effective improvisation.

Organizational configuration is another essential category in factors relating to the effectiveness of improvisation. Some researchers believe that it is necessary to build a close and trusting relationship between members (Crossan et al., 1996; Weick, 1993b) because it develops a safe environment for the occurrence of improvisation. Not all researchers agree with such view (Bastien and Hostager, 1988; Hatch, 1999). Weick (1998) believed that musicians could improvise freely as long as they had been able to form a close trusting relationship with members of the group and where the current

situations allowed for it to happen. Collateral structures in organization configuration can also affect the quality of improvisation where members are free from formal practices and are able to adopt less canonical ones (Brown and Duguid, 1991). Functions of the organizational spaces in collateral structures allow group members to build variations of ideas in producing improvisation. Additionally, it can be a safe environment for individuals to practise improvisation, as well as acting as a platform for improvisation to be performed when there is lack of necessary conditions for improvisation to occur (Peter, 1992; Weick, 1993a).

The element of group size in organizational configurations has the potential to influence its ability to improvise. Considerable, larger size groups can reduce the distinction between routine behaviour and improvised behaviour (Powers, 1981). This might be caused by the fact that, within a large group of people, the notion of co-ordination could not occur based only on mutual adjustment (Mintzberg, 1991), and this type of control would have a negative effect on the ability to improvise (Sharron, 1983). Further, the larger the group becomes, the probability of information distortion becomes higher and the speed of the communication of real time information decreases. It then is likely to reduce the incidence of improvisation (Moorman and Miner, 1995).

The final category of factors in determining the effectiveness of improvisation relates to resources. Limited resources can reduce the group members' ability to transform their ideas into practice. Weick (1993a) commented that multipurpose resources can have multi usages in their application, even if they were not in the organization's original ideas. The flexible and bricolage dimension in resources can help to add on more possible courses of action an organization can take. General purpose resources seem to be able to reduce any constraints that the performers have experienced and, at the same time, increase their potential to depart from the standard routine and support their ability to create a higher level of improvisation (Cunha et al, 2002).

2.6 Creative Cognition

The notion of creative cognition includes a combination of processes; the flexibility of stored cognitive structures, the capacity of memory systems such as working memory; and other known fundamental cognitive principles (Simonton, 1997; Ward, Smith and Vaid, 1997). Creative cognition has been developed from experimental cognitive psychology and often makes reference to basic laboratory studies of 'normative creativity' (Ward et al., 1997). Additionally, it carries a firm belief in the continuity of cognitive functioning between mundane and exceptional creative performance.

Creative cognition includes a range of factors other than cognitive processes in the development of creativity, such as intrinsic motivation, situational contingencies, the timeliness of an idea, and the value that different cultures place on innovation (Amabile, 1983; Basala, 1988; Lubart and Sternberg, 1995; Runco and Chand, 1995; Sternberg and Lubart, 1991). Creative cognition emphasises mental operations due to that fact that it assumes that many non-cognitive factors develop their impact by way of their influence on cognitive functioning (Ward, Smith and Finke, 1999:191). For instance, it is argued that increased motivation would have an impact on the tendency to engage in particular processes, such as the application of analogical reasoning, mental model simulation or conceptual combination. However, the variations in the processes themselves would cause differences in the quality of creative ideas that different thinkers would produce (ibid).

2.6.1 Geneplore Model

One of the early influential frameworks of the creative cognition approach was the 'Geneplore model' (generative and exploratory) of creative functioning (Finke et al, 1992). This framework was proposed as a heuristic model rather than an explanatory theory of creativity. It suggested that:

> "many creative activities can be marked as an initial generation of candidate ideas or solutions, followed by extensive exploration of those ideas. The initial ideas are sometimes described as 'pre-inventive' in the sense that of they are not complete plans for some new product, tested solutions to vexing problems, or

> accurate answers to difficult puzzles. Rather they may be an untested proposal or even a mere germ of an idea, but they hold some promise of yielding outcomes bearing the crucial birthmarks of creativity: originality and appropriateness." (Ward, Smith and Finke, 1999:191)

Overall, the model assumes that an individual would alternate between generative and exploratory processes, developing the structures according to the constraints of a specific task (ibid).

Examples of types of generative process in creative cognition are reported to include the retrieval of existing structures from memory (Perkins, 1981; Smith, 1995; Ward, 1994, 1995), the formation of simple associations amongst those structures (Mednick, 1962), or combinations of them (Baughman and Mumford, 1995; Hampton, 1987; Murphy, 1988), the mental synthesis of new structures (Thompson and Klatzsy, 1978), the mental transformation of existing structures into new forms (Shepard and Feng, 1972), analogical transfer of information from one domain to another (Gentner, 1989; Holyoak and Thagard, 1995; Novick, 1988), and systematic reduction to which the existing structures are reduced to a more simplified version (Finke et al., 1992).

Exploratory processes in creative cognition could involve the searching for desired attributions in the mental structures (Finke and Slayton, 1988), metaphorical implications of the structures (Ortony, 1979), potential functions of the structures (Finke, 1990), the evaluation of structures from different perspective (Barsalon, 1987; Smith, 1979), the interpretation of structures as representing possible solutions to problems (Shepard, 1978), and various conceptual limitations that are suggested by the structures (Finke et al., 1992). Creative thinking then can be subscribed through the ways in which these processes are combined. For instance, a writer might start the beginnings of a new plot line by mentally combining familiar and new concepts, and then develop the ramifications of their combination in fleshing out the details of the story (Donalson, 1992; Ward et al., 1995). Gentner and colleagues (1997) described how a scientist could generate analogies designed to understand one domain in terms of

another, and then strictly examine those analogies to demonstrate their explanatory utility.

2.6.2 The Pre-inventive Structure

The Geneplore model can also distinguish between the cognitive processes that are used in creative cognition and the types of mental structures they operate on. Finke and colleagues (1992) drew up a particular class of mental structure, named pre-inventive structure. The pre-inventive structure can be seen as an internal precursor to the final, externalized products of a creative act, generated with a particular goal in mind or just a vehicle for open-ended discovery (Ward, Smith and Finke, 1999:192). Examples of pre-inventive structures are symbolic visual patterns and diagrams (Finke and Slayton, 1988), representations of three-dimensional objects and forms (Finke, 1990), mental blends of basic concepts (Hampton, 1987; Murphy, 1988), exemplars of hypothetical categories (Ward, 1994, 1995), mental models representing conceptual systems (Johnson-Larid, 1983), and verbal combinations which indicate new associations and insights (Mednick, 1962). The different types of pre-inventive structure depend on the nature of the task (Ward, Smith and Finke, 1999).

The 'Geneplore model' also suggests that the constraints of the final product in creative processes can be influenced from both the generative or exploratory phase at any time (ibid: 192). Such a system allows the model to apply to different types of situations and scenarios. For instance, when constraints are imposed on resources, they can restrict the type of structures, which could be generated. Paradoxically, when constraints are imposed on practicality, they might restrict the types of interpretations. Subsequently, the model seems to see that the two distinct processing stages, the generation and exploration, are applied in most instances of creative cognition (Ward, Smith and Finke, 1992). In the stages of generative processing, mental synthesis, mental transformation and exemplar retrieval lead to pre-inventive structures, which are then interpreted in the exploratory stage by assessing the emergent properties and implications. The forms involved in the pre-inventive structures include mental models and designs, and

exemplars for novel or hypothetical categories. Once the stage of exploration is completed, the pre-inventive structures can be regenerated through new discoveries and insights that appear. The notion of process would be regenerated, until the pre-inventive structures develop to a final, creative idea or product.

2.6.3 Cognition in Group Jazz Performance

Social practices such as behavioural norms and communicative codes are a secondary source of constraint on the jazz process. These are perceived as unwritten conventions amongst the professionals. Mitchell (1978) commented that behavioural norms are shared expectations about appropriate behaviour. They generate integration between musicians. For instance, the leaders of the group normally have the authority to decide and communicate each song and the key in which it is to be played. However, the soloist from the group determines the features of the musical styles, such as timing and level of complexity (Bastein and Hostager, 2002:17). Other members of the group are expected to follow and support the soloists' decisions. The opportunity for being a soloist is equal within the group. Every musician can be the leader of the jazz group during performance. The nature of the chorus is usually the foundation of the soloist's control, but there are exceptions that would be specified by the leader (ibid). Another norm in social practice structure is the communicative codes involving "lexical items such as words or phrases of distinct meaning in the profession and nonverbal codes that have become a tradition in the profession" (Bastien and Hostager, 2002: 18). For instance, gestures such as turning to an individual, eye contact at particular points and hand signals are common in nonverbal codes. They are essential to music performance communication as they aim to demonstrate clear but subtle communication between the musicians.

2.6.4 Cognitive Behaviour in Group Jazz

Cognition within group jazz seems to suggest multiple activities happening at the same time. Poole (1983) suggested a multiple sequence model relating to all the different activities as a unit of strands that generate at the same time. Bastien and Hostager

(2002) adopted Poole's (1983) theory in a case study of group jazz concerts and developed three tracks musical structure, social structure and communicative behaviour (Bastien and Hostager, 2002:21) in addressing the cognitive and behavioural components of change events in jazz performance. The "musical structure" involves conventions and cognitions generated by music theory and compositions. "Social structure" represents behaviour and communicative codes and "communicative behaviour" includes nonverbal and verbal signs (ibid). Poole (1983) also developed the concept of break-points in his model which suggested that there are points in time when changes will take place across all tracks, musical structure, social structure and communicative behaviour. This would impact on change in direction and the nature of group activities. The break-point concept develops insightful ways to analyse changes in cognitive and behavioural elements within group activity (Bastien and Hostager, 2002).

2.6.5 Improvisation and Memory

In jazz improvisation, retrospection is reported to be important to creativity. Gioia (1988:61) described that a jazz musician cannot "look ahead at what he is going to play, but he can look behind at what he has just played; thus each new musical phrase can be shaped with relation to what has gone before. He creates his form retrospectively". It implies that execution, creation and interpretation occur spontaneously and sense making is also involved in the process. The significance of retrospect in jazz improvisation leads to the suggestion that form, memory and practice are the key factors in determining successes. Berliner (1994:194) stated: "the larger and more complex the musical ideas artists initially conceive, the greater the power of musical memory and mental agility required to transform it". Improving memory could also improve improvisation. The type of improvisation could be organizational (Walsh and Ungson, 1991), small group (Wegner, 1987) or individual (Neisser and Winograd, 1988) in nature. Improving memory helps to store a greater range of resources. Berliner (1994:200) supported the importance of memory to improvisation and commented: "aspiring improvisers must cultivate impressive musical recall in both aural and physical

terms if they are to incorporate within their ongoing conversation new ideas conceived in performance."

One notion of the essential determining factors in influencing the quality of improvisation is memory-related factors (Cunha et al, 2002). Organizational memory can affect the direction and quality of improvisation. It can be seen as procedural memory for knowledge of action and declarative memory for knowledge of facts (Anderson, 1983). Specifically, declarative memory is believed to be useful in helping diversity in creativity of improvisation (Amabile, 1998; Moorman and Miner, 1998b; Woodman et al, 1998a). However, an enlarged amount of declarative memory could also slow down the speed of improvisation as individuals would have to spend time in accessing available information (Moorman and Miner, 1998a). The procedural memory element in organizational memory could also affect the performance of improvisation. Setting up a simulated learning environment in a 'real' situation is essential to the development of acquiring improvisatory skills. It helps to enrich resources and strengthen procedural memory (Crossan, 1997).

2.6.6 The Impact of Organizational Memory

Previously, some theorists have suggested that real time information stored in the form of organizational memory might reduce the chances for improvisation to occur (Moorman and Miner, 2002). However, there is a growing recognition that organizations have shown evidence of reference, routines and structures in stored knowledge (Cohen, 1991; Cohen and Bacdayan, 1994; Cohen and Levinthal, 1990; Walsh, 1995; Walsh and Ungson, 1991; Winter, 1987). For instance, in business, firms tend to develop extensions of existing products rather than creating a new one (Andrew and Smith, 1996). Additionally, firms apply well-developed routines and processes for the production of new products (Day, 1994; Leonard-Barton, 1992; March, 1991; Moorman, 1995; Moorman and Miner, 1997). Preston (1991: 89) commented on the negative impact which prior memory is likely to have on improvisation, "In the case of these familiar situations... the scope for improvisation is more constrained." In music,

professional jazz musicians may experience dilemmas in learning the great artists' works in order to improvise and they may have problems in breaking away from this learning (Weick, 1993c). Berliner (1994:206) agreed:

> "it is one of the greatest ironies associated with improvisation, as soon as artists complete the rigorous practice required to place a vocabulary pattern into their larger store, they must guard against its habituated and uninspired use."

There is also considerable research supporting the view that a strong organizational memory will increase the effectiveness of improvisation action (Moorman and Miner, 2002). The majority of improvisation seems to come from the reconnection of past subroutines of knowledge and action (Broko and Livington, 1989; Levi-Strauss, 1967; Nonaka, 1990). Weick's (1993a) analysis of the Mann Gulch disaster showed that the ability of key members of the first team to apply their existing skills in a novel way was vital to effective improvisation. Berliner (1994) suggests that musicians with strong pre-existing knowledge of melodies, chords and rhythms and familiarity with other players create the most inspiring improvisations. In Weick's (1993b: 353) investigation in characterizing organizations, he demonstrated the importance of memory. He suggested:

> " if we think of designers as people who improvise, then the materials they have available to work with are the residue of their past experiences and the past experience of people in their design group, the meaning attached to this past experience, observational skills and their own willingness to reply on imaginative recombination of these materials." (Weick, 1993a: 353)

2.7 Summary

The application of the concept of improvisation has been used in areas other than music, such as drama and business. In drama, the tradition of improvisation has been applied in drama learning at school, and actor training whereas in business, it has been implemented in the training of employees to anticipate new environmental challenges. For music, improvisation also has a long history. Improvisation can be viewed as "real-

time composition" (Pressing, 1998: 142). Improvisation in the Western classical music tradition such as for Baroque harpsichord or classical organ is very much seen as a subset of composition; whereas in genres such as jazz and some other world musics, it is treated more as a separate art form. Expert improvisers in the jazz genre may develop improvising skills by imitating the solos of older generation experts (Berliner, 1994; Kernfeld, 1995; Owens, 1995). Other skills that expert improvisers develop are the skills and knowledge to internalise music during real-time performance, to convert an instrument or the voice to achieve musical intentions, to apply effective strategies in formulating an improvisation and to transform from a range of stylistic convention to a personal creation (Kratus, 1991; Hargreaves et al., 1991; Gordon, 1993; Hallam, 2005). Flow states being "within the groove" (Berliner, 1994:389) and risk taking are recognized as key ingredients in achieving optimal levels of communication in improvisatory performance.

The types of improvisations can be categorised as organizational (Walsh and Ungson, 1991), small group (Wegner, 1987) or individual (Neisser and Winograd, 1988). Three characteristics of organizational improvisation are 'deliberate' (Miner et al, 1996), "extemporaneous" (Weick, 1990; Crossan and Sorrenti, 1997; Mintzberg and McHugh, 1985; Perry, 1991) and "occurs during action" (Miner et al, 1996). Similar characteristics are reported to be evidenced in drama ensemble improvisation and group improvising in music, such as the scenarios and formulaic speech parallel to structures and motifs. In a business context, the nature of the organization influences the development of creativity. The conditions within group improvisation can be defined as an experimental culture, a minimal structure and having low procedural memory (Cunha et al, 2002). Within the conditions, factors such as leadership, member characteristics, information flow, memory-related factors, organizational configuration and resources also have been found to influence the quality of organizational improvisation (Cunha et al, 2002: 119-120).

The creative cognition framework labelled the 'Geneplore Model' supports the inclusion of generative and exploratory processes in improvisation and suggests that the individual alternates between these two processes in developing the structure of musical improvisation. In individual improvisation, improving memory can help to store large amounts of music resources. Expert improvisers have been shown to have high levels of aural and physical skills in musical recall during real-time improvisatory performance (Berliner, 1994). Within group jazz processes, behavioural norms and communicative codes act as a secondary source of constraint (Mitchell, 1978; Bastein and Hostager, 2002). An adaptation of Poole's (1983) multi-sequence, three-track model of musical structure, social structure and communication behaviour (Bastien and Hostager, 2002:21) was devised to study cognitive and behavioural components of change events in jazz performance. The original model (Poole, 1983) suggests the concept of 'break points' where there are points in time when changes will take place across all tracks, musical structure, social structure and communication behaviour. In addition, the role of organizational memory can affect the direction and quality of improvisation. The impact of strong organizational memory increases the effectiveness of improvisation action (Moorman and Miner, 2002). For instance, strong organizational memory of knowledge of melodies chords and rhythms and familiarity amongst jazz musicians could create the most inspiring improvisations (Berliner, 1994).

CHAPTER THREE:

THE DEVELOPMENT OF MUSICAL EXPERTISE IN LEARNING TO IMPROVISE

3.1 Introduction

The focus of this research is to look at how novice and expert musicians from classical and jazz backgrounds learn to improvise in individual and group contexts. In particular, the research seeks to explore the ways in which their different musical expertise impacts on the development of improvisatory skills in different musical genres. The theoretical mapping of the present research applies a framework of creativity in relation to the process, the individuals, the environment and the product. This chapter discusses issues concerning skill development, relevant knowledge acquisition and practice strategies in relation to the development of musical expertise. It investigates the ways that improvisatory skills can be developed in relation to the development of musical expertise and the role of memory in improvisation. In addition, it draws on expertise theories in relation to the similarities and differences in practice strategies which expert and novice improvisers apply in learning to improvise.

Further, it considers the factors that interfere with developing improvisatory skills and practice strategies retrospectively.

3.2 Expertise Theory

Glaser and Chi (1988) defined a number of characteristics of expert performance from a range of domains. Common characteristics are that:

- Experts do best in their own domains;
- Experts are able to recognize large patterns and process them into meaningful knowledge in a very short time;
- Experts perceive a problem at a deeper level;
- Experts develop better short-term and long-term memory;
- Experts invest a longer time analysing problems in a qualitative manner;
- Experts develop sophisticated self-monitoring skills.

These are elaborated in the following sections.

3.2.1 Experts do best in their own domains

Experts are reported to experience difficulties in transferring their exceptional skills and knowledge to a domain other than their own. This is caused by the fact that the development of their expertise depends on the development of a huge area of specialised activities and knowledge. Sudnow (1978) demonstrated how he, as an outstanding professional classical musician, went through a difficult time and had to put in great effort in becoming an expert in jazz improvisation. This study demonstrated that the development of skills and knowledge was very much genre-specific in music. Even advanced learners experience difficulties in transferring their skills and knowledge to another musical genre from the one in which they are specialised.

3.2.2. Experts are able to recognize large patterns and process them into meaningful knowledge in a very short time

In music, skilled readers of music have been found to be able to scan line and phrase boundaries across pages of notation. Furthermore, the system that experts apply in reading music requires fewer eye fixations in order to process notation into meaningful knowledge (Goolsby, 1994). Unlike novice readers, they are able to process more notes in one fixation (Waters et al., 1997). For instance, research has found that skilled music readers were observed reading up to seven notes at the same time, whereas novices only read three or four after the printed page was removed from their sight (Sloboda, 1984; Goolsby, 1994). In addition, expert composers are believed to develop a Gestalt-like approach when working on a composition and are able to process the structure as a whole unit of sounds. In contrast, novices tend to concentrate only on one individual sound at a time (Younker and Smith, 1996). In chess, music, typing, physics and route planning, experts are able to develop their skills to a high level that become automatic in operation. This enables the freeing of memory capacity to attend to other tasks (Hallam, 2004). However, this does not necessarily imply the capacity of short-term memory in experts is in anyway larger than that of novices (ibid).

3.2.3 Experts obtain better short-term and long-term memory

In de Groot's (1996) research on chess masters, experts and novices, he found significant differences in their memory of chess positions. The chess masters were able to remember almost all the positions from a chessboard. In comparison to chess master's memory of chess positions, the experts and novices could barely complete the same task and spent a much longer time processing. Chase and Simon (1973) commented that the outstanding processing in short and long-term memory of the chess masters was only explicit in meaningful chess positions and did not transfer to all the materials used in the research. Their expertise was limited to chess positions.

3.2.4 Experts perceive a problem at a deeper level

Experts perceive a problem at a more profound level than the novices. Hallam (2005:7) suggests that 'the conceptual categories which experts adopt in problem solving are semantically principle based, whereas those of novices are syntactically or surface feature oriented'. In organizing categories, physics experts apply principles of mechanics whereas novices operate around literal objects (Chi et al., 1981). In the domain of programming, experts exercise solution algorithms in problem solving, whereas novices operate by areas of application (Weiser and Shertz, 1983).

3.2.5 Experts invest a longer time analysing problems in a qualitative manner

Experts invest a longer period of time analysing problems in a qualitative manner before solving them (Hallam, 2005). They intend to apprehend more fully the nature of the problem to the extent that they can mentally work out and identify solutions. For example, in creative processes when problems are abstract, Collins (2005) documented the detailed journey of how an expert composer analysed problems. At the macro level, the expert drew a general framework from the mental image of the composition consistently, while at the micro level the linearity in reproducing problems and implementing solutions was evident. In problem restructuring, Gestalt creative approaches were utilized in real time, while other events suggested parallelism in the thinking process. Analysing problems and finding solutions were discovered to be overlapping. In relation to problem solving, experts acquire better self-monitoring skills than the novices (Hallam, 1995; 2001a; Larkin, 1983). In terms of judging the difficulty of a problem and choosing suitable strategies in solving problems, experts demonstrate much stronger ability (Chi et al., 1982; Hallam, 1995; 2001a).

3.2.6 Stages in the Development of Expertise

In becoming expert improvisers, individual learners are required to develop high levels of musical skills and relevant knowledge acquisition. In the general development theory of expertise, three primary stages have been defined in acquiring high levels of performance (Mitchell, 1993; Gelman and Greeno, 1989; Jetton & Alexander, 1997; Alexander et al., 2002). An initial cognitive-verbal-motor stage relates to procedure skill development. During this early stage, the learner (i) comprehends the requirement needed for improvement, (ii) continuously betters themselves through learning, whilst at the same time (iii) self-instruction is consciously carried out. Learning develops when the learner understands the process and the aim of the learning to the extent that a transparent mental representation is available. In addition, the learner needs constructive feedback from the environment and observers. During the second associative stage, the learner gradually articulates a polished sequence of responses. Mistakes from the learning process are recognized and corrected from feedback and self-monitoring. In this model, when the learner arrives at the third and final stage of acquiring expert levels of performance, their skills become automated and continue to develop each time the execution is exercised. The step-by-step action in carrying out the skills disappears into unconsciousness as the development of automaticity proceeds. The learner then finds it challenging to clarify their action to others (Fitts and Posner, 1967).

In relation to acquiring knowledge rather than skills, the initial stage has been referred to as 'acclimation' (Mitchell, 1993; Alexander, 2003; Jetton and Alexander, 1997). The learner must adjust to unfamiliar domains and is likely to be unable to differentiate knowledge that is correct/false and whether it has an appropriate/tangential nature (Alexander, 2003; Jetton and Alexander, 1997). In the second stage of knowledge acquisition, learners begin to observe an area of fundamental knowledge using a combination of surface and deep approaches to learning (Hallam, 2005). The nature of the fundamental knowledge is based on principle. The learner is believed mainly to be motivated by the learning environment. When the learner arrives at the third and final

stage, he or she develops and concentrates on deep approaches to processing. The level of knowledge required in the final stage is complex and demands strong self-motivation (Alexander et al., in press).

In theory, the learning of skills and knowledge has been defined as two individual components. However, in reality, the development of acquiring skills and knowledge often work side by side with each other. Hallam (1995; 2001a; 2001b) suggests that 'knowledge based mental representations of appropriate outcomes are required to check for errors, to select possible strategies and monitor progress'. The learner might improve in learning solely from self-monitoring strategies, but progress would be restricted by not having sufficient prior knowledge in a domain.

3.3 Automaticity in Musical Learning

The importance of automaticisation for expert performance has been recognized since the late Nineteenth century. Bryan and Harter (1899) concluded from a study of improvement in performance at telegraphy, "only when all the necessary habits, high and low, have become automatic, does one rise into the freedom and speed of the expert" (p.357). As mentioned earlier, research has investigated the differences between attentional oriented controls and automacity in practice and found three stages of skill acquisition (Schneider and Shiffrin, 1977), namely cognitive, associative and autonomous (Fitts, 1964).

In music, when the learner arrives at the final stage of acquiring expert levels of music performance, their skills are automated and continue to develop each time the execution is exercised. When the student arrives at an advanced level of playing an instrument, they not only need to master the new complex skills, they also need to continue with the skills that have already been accomplished beforehand. In doing so, the student will be able to achieve a high level of automaticity in playing. As one set of

skills comes closer to automaticity, others develop through the associative and cognitive stages (Lehmann & Gruber, 2006).

The role of automaticity is significant in musical skill development and knowledge acquisition in relation to the development of improvisatory skills. In order to be able to produce high levels of improvisatory performance, learners are required to process new information in a very short amount of time. Consequently, the acquired skills and knowledge need to be automated in order to allow the creative improvisers maximum freedom to transfer music related motor learning and relevant domain knowledge to the real time creative process. Further, in becoming an expert improviser, multiple sets of skills are acquired to develop spontaneously to the stage of automaticity, such as aural skills, sight-reading and memory related skills.

3.4 Physiological Adaptations

In relation to the development of musical improvisatory skills, musicians also undergo a number of physiological adaptations as expertise develops. Wagner (1988) established that the degree of forearm rotation differed systematically between pianists, violinists and control groups. Pianists seemed to have a larger extent of inward rotation, whereas violinists were shown to have more outward rotation. However, the overall degree of rotations remained constant between pianists, violinists and control groups, but the differences shifted more towards habitual usage for the instrumentalists. Sundberg (1987) found significantly larger vital and total lung capacities in singers and brass players. In trumpet players, superior inhalation and expiration pressures were also found after several long notes were played (Fiz et al, 1993).

Instrumentalists develop different perceptual and motor skills from those of non-musicians. Motor researchers have found that pianists are able to tap faster and more accurately than control subjects with their fingers. However, these skills do not transfer to their heels (Keele, Pokorny, Corcos & Ivry, 1985). Musicians also develop a finer

frequency and loudness discrimination than non-musicians (Houtsma, Durlach & Horowitz, 1987). Instrumentalists who require fine-tuning of individual notes during performance develop a more accurate discrimination of pitch, whereas percussionists seem to have a superior perception of auditory duration (Rauscher & Hinton, 2003). Expert pianists develop increased sensitive tactile discrimination as a result of the amount of practice undertaken (Ragert, Schmidt, Altenmuller & Dinse, 2004). Overall, the superior skills and abilities of senses and adaptations of the motor systems are limited to the particular stimuli that musicians habitually encounter in playing their instruments. This implies that the development of automaticity in musical learning is highly specific and is largely influenced by training and practice (Lehmann & Gruber, 2006).

3.5 Reading music

Reading music is an essential skill in the development of musical expertise. Goolsby's (1994) study suggested that expert readers read music differently to the novices. They are able to scan across line and phrase boundaries, whereas the novices fixate on one note at a time. The eye movements from the experts focus relatively far ahead in the score and at the same time are able to return to the current point of performance. Further, experts operate efficient ways of scanning the page and require little time to be spent on each fixation. During the process of scanning the page, they develop fewer fixations due to the fact that they are able to process more information in one fixation than the novices (Water et al., 1997). In music reading, the motion of eye-hand span synchronizes with musical phrase boundaries. The movement increases and reduces as boundaries change, suggesting that experts have a refined ability to organize musical content into meaningful patterns (Sloboda, 1984).

When it comes to contrapuntal music, music readers trace the melodic line horizontally, whereas in homophonic music, they scan chord by chord and in a more vertical fashion (Weaver, 1943). The ways that music readers visualise patterns are very much

individualised. The fact that the time that readers spend on fixations reduces and eye movement increases as knowledge develops suggests that part of the materials is somehow already known (Hallam, 2005).

Hodges (1992) defined several strategies to assist children in reading music: use of mnemonic devices, body movements, tonal patterns, singing, learning the score vertically and practicing with accompaniment. However, these teaching strategies are not supported by theory and the findings are inconclusive. Facilitating students in composing, performing and listening (Bradley, 1974; Hutton, 1953), encouraging music reading pre-study before formal training (Hewson, 1966), and displaying song texts along with higher and lower melodic pitches when learning to read music (Franklin, 1977) are believed to be effective strategies and are based on theoretical aspects.

3.6 Sight-reading

Sight-reading is a high level skill involving combinations of abilities in processing visual materials accurately in real time. To succeed in sight-reading involves aural imagery, sight-reading experience, cognitive and thinking styles, an external focus of control (Kornicke, 1995), expertise in music, fast information processing and psychomotor speed (Kopiez et al., in press). In organ playing, students are required to develop sight-reading skills to an advanced level as part of their improvisatory skills. In piano playing, students develop sight-reading skills by investing time in accompanying different styles of repertoire (Lehmann and Ericsson, 1996). Acquiring strong rhythmic ability can improve sight-reading performance (Elliot, 1982).

Skilled sight-readers who concentrate more on the context than planning ahead are more likely to have problems with unexpected information (Waters et al, 1997), but excel at the type of tasks where they need to fill in blank spaces in a score with a suitable note (Lehmann and Ericsson, 1996). Sight-readers sometimes make mistakes

by filling in notes, which are not in the score due to the fact that they associate better with familiar patterns than reading individual notes (Sloboda, 1976).

McPherson (1994) believes that expert sight-readers are capable of assimilating more information from the score before they start to play than novices. Skilled sight-readers are also able to improvise and sight-read music without prior rehearsal, which constitutes a high-level performance skill in processing complex visual material in a very short space of time (McPherson and Gabrielsson, 2002). Some researchers have claimed that sight-reading and improvising present 'two sides of the same coin' (Thompson and Lehmann, 2004:151). They propose that these two skills share more common characteristics than one might realise. Improving sight-reading by constantly utilizing skills in accompanying someone or playing in a group is recognized as one very effective development strategy (Banton, 1995; Kornicke, 1992; Lehmann and Ericsson, 1996).

3.7 Performance

In acquiring high levels of improvisatory performance in music, learners are required to develop sufficient performance skills in order to achieve an optimal level of communication with their audience. The essence of music performance is communication with the audience and fellow musicians as evidenced by research with professionals, music students and school age pupils (Prince, 1994; Founta, 2002; Hallam and Prince, 2003). Communication involves shared meanings, understandings and intentions between performers and audience (Mead, 1934). A significant element in the communication between a performer and an audience is the interpretation of the music. The nature of human performance in music encompasses the printed score. However, each time musicians perform a piece of music it differs. The differences can be as refined as a single bar that varies in timing, loudness, tonal quality and intonation. The differences in variations are an important element in the expressiveness of a performance (Shaffer, 1992). In improvisatory performance based on jazz, legendary

jazz musicians such as Charlie Parker were reported as being famous for making sure that they never repeated their solos as an essential element of communicating expressively to their audience (Owen, 1994).

Many musicians are seen to utilise an intuitive approach based on their intuitive feelings and instincts. In contrast, some adopting a holistic approach develop interpretation before playing by analysing the musical structure, listening to the music and comparing alternative interpretations from recordings and live performances. Most musicians have a preference for one approach (Hallam, 1995b). Effective communication of expression develops when listeners are facilitated to understand and interpret variations in performance. More successful communicators apply the use of expression consistently and elaborate these to a full extent (Sloboda, 1983). Body movements in performance draw attention to particular elements in the music (Davidson, 1993; 1995; 2002). Performing from memory enhances the communication process, as it is believed to enhance the audience's visualisation (Williamon, 1999).

3.8 The Role of Feedback in Music

Considering the role of feedback in music performance, it can include a range of perceptual sources; auditory feedback, kinaesthetic motor movements and visual information of hand positions. However, feedback may be less important for performance than learning. Lashley (1951) found that auditory feedback in music performance using an electronic keyboard showed little or no effect by its absence. The movement sequence cannot be controlled by the chaining of responses based on feedback. Repp (1999) also reported small effects of feedback absence on variables of expressive performance, and stated that there were "no serious disruptive effects" (Repp, 1999: 435) of removing auditory feedback. However all of these studies are based on performance of music notation.

3.8.1 Effect of Auditory Feedback in Musical Performance from Memory

According to the closed loop theory of Adams (1971) and Adams and Bray (1970), perceptual feedback in learning is crucial in both verbal and motor domains. At the same time, perceptual feedback is also important in the schema theory of Schmidt (1975). These theories suggest that auditory feedback is important for musical learning (Welch, 1985; Repp, 1999). In a number of investigations involving learning and memory, where music performance involves auditory based conceptual dimensions such as pitch, tonality, harmony, meter and melodic structure, a skilled adult pianists' ability to learn new music is mainly generated from conceptual dimensions relating to auditory features of pitch and melody (Palmer & Meyer, 2000). However, in performance, skilled musicians tend to make mistakes, which reveal interactions between a shared pitch and temporal structure, such as diatonically or harmonically based errors (Drake & Palmer, 2000; Palmer & Drake, 1997; Palmer & van de Dande, 1993, 1995; Repp, 1996). Although some of these studies were based on sight-reading tasks instead of performance from memory, the findings suggest that skilled musicians remember music in terms of pitch and duration. The role of auditory feedback in musical improvisation may be different to music performed from notation. However, there is limited research on the role of auditory feedback on improvisatory performance.

Further, Finney and Palmer (2003) have investigated the effects of auditory context on learning and retrieval on memorised music performance. The findings suggested that auditory feedback during learning significantly improved later recall. However, there was no improvement in tests from auditory feedback and no interactions of conditions in learning and test. Auditory feedback in memorized music performance seems to be a contextual factor that affects learning. At the same time, it is independent of retrieval conditions (Finney & Palmer, 2003).

3.9 Musical Memory

In music performance where musicians perform without notation, the sequence of movements is specified by the original written instruction and performance is supported from memory. Memorized music performance is an extensive form of serial recall and memorizing music for performance is a high order task (Chaffin & Imerh, 1997).

Musical memory is often associated with the memorisation of skills for performance. In the skill acquisition involved in playing an instrument, the learner uses both declarative and procedural knowledge spontaneously. Working memory functions in the short-term and permits the learner to practise information and store it in consciousness, convert the incoming information into coded forms in order to retrieve it subsequently from long-term memory. In addition, it allows information from long-term memory to be restored and to be applied to the execution of tasks. The capacity of working memory is restricted to small amounts of information, which can only be processed in a limited quantity at a time. It takes a considerable amount of time to rehearse information for it to be transferred to long-term memory. Limited research has been done on the role of working memory in learning to improvise.

Rehearsals divide into two categories, maintenance rehearsal (repetition) and elaborative rehearsal (relating new information to existing information) (Hallam, 2005). The learner finds it quicker to learn new information when this is already established in existing knowledge. Repetition in musical learning often results from incidental learning where learners develop their skills without conscious effort (Hallam op cit). Students need to be aware of a range of appropriate learning strategies which they can apply in order to learn efficiently. This process is described as meta-cognition (ibid). Adults and older children possess sufficient meta-memories and have good judgement in assessing their strengths and weakness relating to memorization, utilising strategies to remember materials and choosing suitable strategies for particular tasks. Further, they also develop strong self-monitoring skills in evaluating their progress in memorisation

and adopting changes in strategy application. The learning involved in memorisation for musical performance takes time. Children who are younger than seven years old might have difficulty in realising exactly what is required in memorisation procedures (Hallam and Stainthorp, 1995).

3.9.1 Memorization in Music Performance

Memorising music for performance is reported to increase the quality and value of musical communication and musicality (Williamon, 1999) and allows the audience to appreciate the performers' movements and gestures (Davidson, 1993; 1994). Musicians are constantly developing effective strategies to memorise music for performance. In the early research on memorising for performance, it was found that the most effective ways to retain the learning of musical fragments was away from the keyboard (Kovacs, 1916). Rubin-Rabson (1936; 1939; 1940a; 1940b; 1941a; 1941b; 1941c; 1941d) developed experimental procedures to analyse the most effective ways of memorizing music. In the findings, she reports a number of ways to improve keyboard memorisation:

- Implementing analytical pre-study before physical practice;
- Distributing practice over a period of time;
- Learning each hand separately;
- Exercising mental rehearsal in the rehearsal schedule;
- Working in small sections.

The strategies above are believed to have great impact in helping students to overcome difficulties in memorising music. The findings from early studies in memorising music have been supported by more recent research. For instance, analysis of music to be memorised enhances learning (Ross, 1964; Williamson, 1964; Nuki, 1984; Kopiez, 1991; Hallam, 1997a), as well as the consideration of structural musical boundaries (Williamon and Valentine, 2002; Chaffin et al; 2002; Ginsborg, 2002), encouraging memorisation and monitoring progress in early learning (Ginsborg, 2002), and

developing multiple coding strategies (Nuki, 1984; Lim & Lippmann, 1991; Hallam, 1997a). Playing the music is more efficient than reading the score alone, even if the reading is guided by listening to the music (Lim & Lippmann, 1991).

Different strategies, including visual, aural and kinaesthetic, support a solid foundation in developing a schema which acts with minimal effort as well as being in harmony with a structural framework supported by knowledge and structure of the music. The use of multiple systematic strategies produces multiple retrieval structures. Research has shown that instrumentalists can memorise without any additional strategies. Memorisation occurs at the end of the learning process providing that the music performance is already at an advanced level (Chaffin & Imreh, 1994; 1997; Chaffin et al., 2002; Miklaszewski, 1995). However, such an approach does not lead to secure retrieval. Changes in strategies arise in the development of expertise (Hallam, 1997a; McPherson, 1995/6). Hallam (1997a) found that strategies applied by professionals relied on the nature of the material for memorization, personal preference and discerned level of performance anxiety. Combinations of aural, kinaesthetic, visual and analytic strategies were adopted during the learning process. In the case of novices, they applied similar automated processing strategies, but made little use of conscious cognitive analysis. In McPherson's (1994) study, where the behaviour of young instrumentalists was analysed during a combination of playing and non-playing time to memorize short phrases, it was discovered that there was a similar increase in utilising aural strategies and mental rehearsal as the level of expertise advanced. Novice musicians seemed to depend mainly on automated processing. As their expertise progressed further, the development of conscious cognitive strategies increased.

3.9.2 Experts and memory in music learning

Experts tend to develop superior long-term retention for domain specific knowledge. For instance, incidental memory for music just played correlated with accompanying skills in classical pianists (Lehmann & Ericsson, 1996). Kauffman and Carlsen (1989)

discovered that musicians have better abilities in recalling musical material than non-musicians, especially when the material is structured according to rules of tonality. The differences between novices and experts decrease when random note sequences have to be recalled (Kauffman and Carlsen, 1989). This interaction demonstrates the way that experts' memory skills have adapted to the structure of stimuli (Lehmann & Gruber, 2006). One of the essential factors in the development of expertise is the accumulation of increasingly complex patterns in memory. It has been demonstrated that expert knowledge can be retrieved from long - term memory in a very short space of time (Ericsson & Kintsch, 1995). Chaffin and Imreh (2001) showed systematically how a concert pianist developed superior mental representation of a rehearsed piece from memory under highly stressed conditions on stage.

Experts demonstrate excellent abilities to memorise across all domains (Chase & Simon, 1973). Despite the differences in the outcomes of memorisation between novice and experts, the memories of both work in the same way. The theory of expert memory abilities is based on the general principles of memory theory (Chaffin & Imerich, 2002; Ericsson & Kintsch, 1995). The structure of superior memory involves knowledge, strategy and effort (Chaffin, 2007). Experts' domain knowledge starts to develop into chunks that can be stored in memory (Mandler & Pearlstone, 1966; Miller, 1956; Tulving, 1962). In music memorisation, chunks involve patterns, such as chords, scales and arpeggios. These have been seen to be significant in music practice and training (Halpern & Bower, 1982; Imreh & Chaffin, 1996/97). Secondly, expert memorists develop a retrieval scheme to gain access to the chunks that are already stored in their memory (Ericsson & Oliver, 1989). In addition, increasing the amount of practice improves the speed of retrieval significantly, to the extent where experts use long-term memory to perform tasks, whereas others depend on working memory (Ericsson & Kintsch, 1995). However, the link between the theories of expert memory and music performance is not as explicit as that derived from expert memorization in other domains such as chess (Chase & Ericsson, 1982; Chase & Simon, 1973); strings of digits (Chase & Eruicsson, 1982; Thompson, Cowan & Frieman, 1993), and dinner

orders (Ericsson & Oliver, 1989). The difference between these domains and the domains of music are the roles of declarative, motor and audio memory. In music, motor and auditory memories are as important as declarative memory, whereas in other domains declarative memory is primary (Chaffin, 2007).

3.10 Practice in music learning

Musical practice is essential in developing expertise in music. Erisson and colleagues (1993) introduced the concept of 'deliberate practice' and constraints such as motivation, resources and attention were defined as the factors in determining the quantity and quality of practice (Ericsson et al, 1993). Further, the distinction between formal and informal practice lay in the fact that a formal format was linked to 'deliberate practice'; informal practice was recognized as already playing learned materials or improvising (Sloboda et al, 1996). A complementary approach addresses the use of conscious practising strategies (Jorgensen, 1995; Ribke, 1987). Jorgensen (1995) defines practice as 'self-teaching' and believes that musicians need to recognise the specific aims, the content of the music, appropriate learning facilities, the amount of time and methods during 'self teaching'. Four types of strategies are outlined: planning; the direction of practice, the assessment of practice, and meta-strategies. A similar view of practice is as self-regulated learning (McPherson and Zimmerman, 2002). Hallam (1997c) defines effective practice as 'that which achieves the desired end-product, in as short a time as possible, without interfering negatively with longer term goals'. Therefore, effective practice is a practice-orientated activity in the short term, which does not interfere with musical learning progression in the long term. Additionally, it can take many forms and requires a great deal of appropriate support and metacognitive skills to complete task requirements (ibid). Models have been developed to contribute to a framework that covers a wide spectrum of music practice (Hallam, 1997c; Chaffin and Lemieux, 2004).

3.10.1 The Effect of Practice

The amount of time spent on practice is an important factor in the development of expert performance. A consistent relationship has been established between 'deliberate practice' and performance acquisition in each individual. Evidence has shown that amongst higher education music students and school aged musicians, those with the highest level of expertise spend more time in practising than their less able peers, although, there are also considerable levels of individual difference (Ericsson et al, 1993; Jorgensen, 2002; Sloboda et al., 1996). A study of one thousand music students participating in a German national music competition found that the prize winner had spent more time practising, before the competition and in the usual practice routine (Deutscher Musikrat, 1993). Neiman (1989) also found in teaching elementary conducting skills to adolescents that the degree of success relied more on motivation and daily practice than on age, sex or physical co-ordination.

However, other studies have challenged the simplistic nature of the monotonic relationship between expertise and practice. Evidence has shown that students marked by their teachers as having greater ability, tend to practise less on their main instrument, but spread the amount of the practice time equally across three instruments (Sloboda and Howe, 1991). This is also evidence that in the short term increased practice does not equal the level of improvement over an eight-week period (Wagner, 1975). Similarly, there is no direct relationship between total practice time and performance achievement (Zurcher, 1972) and there is very little significant difference between students who spend 30 minutes practising before and after private lessons and those who do none just before a lesson (Kafer, 1982).

3.10.2 Strategies used by Experts

Numerous studies have investigated the ways that expert's practise (Wicinski, 1995; Miklaszewski, 1989; 1995; Chaffin and Imreh, 1994; 1997; Chaffin and Lemieux, 2004; Chaffine et al, 2002; Hallam, 1992; 1994; 1995a; 1995b; 2001b; Nielsen, 1997; 1999; Williamon and Valentine, 1992; Williamon et al. 2002) and collectively suggest that:

- most professional musicians acquire an overview of the music when they are in the early stages of practising a new work;
- the structure of the music influences the way that it is divided into sections for practice;
- sub-sections might be further identified within the musical structure in order to attend to technical problems;
- the more complex the structure of the music, the smaller the chunks that are practised;
- the units of practice become larger as the amount of time spent on practice increases. However, smaller sections might still be focused on during practice;
- at the end of practice, the length of the passages where specific work is carried out becomes more similar;
- a hierarchical structure tends to develop where performance plans are progressively integrated into a coherent whole. This process is largely guided by musical considerations;
- there is individual diversity in the ways that musicians practise. For example, strategies such as playing through the music without stopping, playing through and stopping to practise sections and selecting sections for particular purposes. The choice of strategies depends on the different stage of practice;
- technical practice mainly depends on slow analytic work, repetition, deliberate attempts to speed up, and variation of materials, e.g. rhythm, bowing, tonguing;
- detailed progression of practice on a particular piece varies in response to the actual music itself, but the learning outcomes and the integrated performance plans, seem to be similar for all. The routes in making progress can be varied depending on the preferred automated and conscious strategies adopted (see Hallam, 2005).

There are individual variations in warm-up exercises that musicians apply to begin practice and they are perceived as an important part of the practice (Hallam, 1995a).

Practice for technical purposes usually follows repertory work (Duke et al., 1997; Jorgensen, 1998). Some exercises are designed to address specific challenges from musical works (Harvey et al, 1987; Pacey, 1993; Pierce, 1992; Hallam, 1995a, Nielson, 1999). However, an alternative approach amongst musicians is to practise difficult sections within the music being learnt (Hallam, 1995a; Harvey et al., 1987). It has also been found that different speeds in music performance could activate different muscles (Winole et al., 1994). Combinations of slow and fast practice might be the most effective (Donald, 1997).

3.10.3 Novice and Expert Comparisons in Practice

Gruson (1988) and Hallam (1997a; 1997b; 2001a; 2001b) have investigated changes in practice as expertise develops. The findings illustrate that novices usually seem to be unaware that they are making errors. This might be due to the fact that they do not have the appropriate internal aural schemata and/or have problems in recognizing difficult sections. Also, this lack of awareness may be caused by insufficient technical schemata, leading to a tendency to practise by playing through music rather than concentrating on difficult sections. When novices start to correct the errors, they tend to repeat single wrong notes. As the development of expertise progresses further, they repeat small sections such as half a bar or a bar when errors are made. As they progress they make changes in focusing error correction on "difficult sections" (Hallam, 2005:Chap 8-7) which are worked on as units. Also there is a tendency to focus first on playing notes that are at the correct pitch in learning to read music. Attention then is directed to rhythm, followed by all other technical aspects in playing and, finally, dynamics, interpretation and the expressive aspects of playing. This has been referred to as a 'production deficiency' (Flavell et al, 1966). The findings also show that strategy use does not influence the quality of performance. (Hallam, 2005)

3.10.4 Developing aural schemata in practice

Hallam (1997b, 2001a, 2001b) demonstrated that novice violinists did not correct their mistakes when learning a new piece, as they were not able to identify their own errors. In the case of performers, arrangers, conductors and composers, Whitaker (1996) found it necessary to establish a mental template that served as the focus for all learning and performance activities. Unlike the professionals, most students were not able to activate auditory schemata from written notation (Grondahl, 1987). Recorded aural models might help to develop aural schemata (Folts, 1973; Rosenthal, 1984; Rosenthal et al., 1988; Puopolo, 1971). However, in the case of beginners, aural models alone did not have any significant effect on performance achievement (Hodges, 1975).

3.10.5 Metacognitive Strategies in Practice

Metacognitive strategies are about the planning, monitoring and evaluation of learning. They are reported to be significant for practice and can be applied to task requirements, attainment in developing music expertise and standards of instrumental playing. There are differences between beginners, novices and experts in their knowledge and deployment of different practising and self-regulating strategies (Hallam, 2001b; 2001c; Pitt et al., 2000a; Austin and Berg, in press). Additionally, there are individual differences among musicians and novices at the same level of competence (Nielsen, 1997; 1999a, 1999b, 2001; Austin and Berg, in press). Hallam (2001a) showed that professional musicians had well developed metacognitive skills. They are aware of their strengths and weaknesses, have extensive knowledge relating to the nature of different tasks and how to achieve them, and apply strategies in response to different needs. Novices applied less metacognitive awareness. The amount and structure of novices' practice are more likely to be determined by external commitments such as examinations.

The planning and organization of practice is significant in achieving effectiveness in practice. Manturzewska (1969) showed considerable differences in the organization of practice among high and low achievers in professional pianists. Prize-winners did not

appear to work as intensely as the most diligent students. However, their work was seen to be more regular and systematic than in others and it took priority over other activities. Some students demonstrated a regular routine, but others changed their strategies from session to session (Jorgensen, 1998). Some practised at the same time every day (Duke et al, 1997) and others planned practice as a daily or weekly organization (Jorgensen, 1997). The morning seems to be the best time for high levels of concentration. Ericsson and colleagues (1993) discovered that conservatoire students at the highest levels of expertise tended to practise in the morning. Often, conservatoire students were found to start practise without clear goals (Jorgensen, 1998) despite practice being demonstrated to be most effective when practice is organised in sequential and logical manner (Santana, 1978; DeNicola, 1990; Price, 1990; Barry, 1992).

3.10.6 Motivation and Self-regulated learning

Motivation and self-regulated learning are crucial in music practice (Austin and Berg, in press; Gelrich, 1987; McPherson and Zimmerman, 2002; McPherson and Renwick, 2001; Nielsen, 2001). Some activities during practice sessions are not learning related, i.e. day dreaming, avoidance behaviours (Hallam, 1992; Pitts et al, 2000a; McPherson and Renwick, 2001). McPherson and Renwick (2001) demonstrated that over three years, as students became more self-regulating in their practice, a higher percentage of practice time was used on improving performance and less time was spent on responding to distractions, talking to others, daydreaming or expressing frustration. Students of a higher level of expertise appeared to apply a balance between formal or required practice tasks and informal, creative activities such as playing a favourite piece or improvising (McPherson and McCormick, 1999; Sloboda and Davidson, 1996). Self-regulated learners seemed to manipulate their environment in order to optimise learning (Barry and McArthur, 1994; McPherson and Zimmerman, 2002).

3.10.7 Rehearsing in Groups

Studies of rehearsing in small groups have demonstrated that there are considerable variations of strategies for ensemble repertoire (Davison & King, 2004). Each group adopts and develops their own ways for rehearsing. For instance, high school student ensembles developed four activities in rehearsals: initiating, performing, orientating and assisted-learning (Berg, 2000). For the requirement of an individual's part within ensembles, they seemed to concentrate on intonation, dynamics, articulation and rhythmic accuracy. Goodman (2000) showed that in professional groups, a plan for the organization of rehearsal is usually available. Players tend to continue with individual practice sessions throughout rehearsals, using either sequential or non-sequential strategies. These sequential strategies are effective in inspiring new ideas for subsections of the work. There seems to be a need for variations in the pace and intensity of work in order to maintain concentration and interest (Cox, 1989).

Research done on ensemble rehearsal has been growing, including piano duos (Williamon and Davidson, 2002), cello-piano duos (Waterman, 1996; Goodman, 2000, 2002; Davidson and King, 2004), string quartets (Young and Colman, 1979; Blum, 1986; Butterworth, 1990; Murninghan and Conlon, 1991; Tovstiga et al., 2004), wind quintets (Ford and Davidson, 2003), choirs (Yarbrough, 1975; Cox, 1989) and orchestras (Faulkner, 1973; Atik, 1994; Weeks, 1996). Davidson and Good (2002) showed that the music is the focus of group cohesiveness. Trust and respect are also significant for groups to function well over long periods of time (Young and Colman, 1979). Long-term successful rehearsals depend on strong social frameworks. The smaller the group, the more crucial personal friendships appear to be (Blank & Davidson, 2003). In large groups, such as orchestras, the individual player's sense of self needs to be diminished to accommodate group affiliation (Atik, 1994). The characteristic of small group interactions is moving from conflict to compromise (Young and Colman, 1979; Murningham and Conlon, 1991). The main purpose of the interactions is for the musical content and its co-ordination, but sometimes they are of a more personal nature. Non-verbal communication increases during the rehearsals as

the performance approaches (Williamon and Davidson, 2002) and it seems to solve problems when discussion has failed (Goodman, 2002; Murningham and Conlon, 1991).

3.11 Summary

The common characteristics of expert performers include being high achievers in their own domains, quick learning of new information and processing into meaningful knowledge, being able to analyse problems in depth, acquiring long-term memory which can be used for short term problem solving, spending longer in analysing problems and being highly self-critical. Primary stages are reported in developing both high levels of musical skills and knowledge, while theoretically, the learning of skills and knowledge has been separated, in practice; they frequently assist each other spontaneously. In learning to improvise in individual contexts, learners spend a considerable amount of time and commitment in developing high levels of musical skill and relevant domain knowledge. This enables learners to achieve automaticity in musical performance skills so that the transfer of learning and skills to real time creative processes can occur. Memorisation skills and musical memory strategies are significant in developing improvisatory related skills, as they are necessary for both skill development and the acquisition of appropriate musical schemata.

CHAPTER FOUR:

METHODOLOGY

4.1 Methodological Enquiry related to the Present Study

The research focus of this thesis is to investigate how novice and expert musicians from classical and jazz musical backgrounds, learn to improvise. It emphasises the development of strategies and skills relating to cognitive processes in learning to improvise. The main research question is:

How are improvisatory skills developed in individuals and teams?

Additional related sub-questions arising from the main research question are:

What strategies do expert and novice improvisers use when learning to improvise?

What factors influence the development of strategies and skills in learning to improvise?

What are the relationships between memory and learning to improvise?

What effect does expertise in a different musical genre have on these developing skills?

The study aimed to capture multi – dimensional pictures of the 'doing, feeling and knowing' of musician learning to improvise from two diverse genre backgrounds, classical and jazz, as well as relating the learning perspectives to the complexity of the improvisatory phenomena. The choice of the methodology developed from an introspection of my own learning to improvise. This provides the basis for subsequent critical analyses in examining essential characteristics and influencing factors in both individual and group contexts. Overall, the methodology developed from the multiple perspectives of creativity, expertise and educational research.

4.2 Research methods in musical expertise

Studies of individual differences in musical expertise have a long established history in music. For instance, Barrington (1770) investigated Mozart's early performance and documented this in great detail. The studies of Billroth (1895) on musicality were seen as the beginning of 19th century research on musical abilities. In the late 1930s, Seashore published his studies on assessment of perceptual discrimination abilities, while in the 1970s, Wellek (1970) tried to identify racial differences in musical abilities. The majority of music aptitude tests were aimed at predicting potential for music performance (Boyle, 1992), although the evidence also suggested that musically talented children tend to gain high scores in other types of ability tests (Shuter-Dyson, 1999). Some research focused on the role of heritability. For example, musicians such Bach, Couperin, Garcia and Strauss came from families of musicians. However, studies of genetic background and environmental influences have shown that there are complex interactions between the two and it is unlikely that with currently available methodologies the contributions of each will be able to be identified (Gembris, 1998).

The importance of home environment factors in developing musical talent has been well documented (Csikszentmihalyi et al., 1993; Sosniak, 1985). For example, an investigation of Polish professional musicians found common patterns of attitudes, value systems and family structure in the family origins of musicians (Manturzewska,

1995). The majority of studies undertaken on musical expertise have focussed on the Western art music tradition, and the findings from research on jazz, popular music or world music traditions tend to present different results (Berliner, 1994). For instance, beginners' musical training at an early age occurs most frequently in pianists and violinists of the classical music traditions, whereas jazz guitatists (Gruber, Degner and Lehmann, 2004) and singers (Kopiez, 1998) tend to begin their training much later.

4.3 The chosen methods for the current studies

A range of methods that have been adopted for exploring creativity and musical expertise are appropriate for investigating different aspects of the present study. Methods such as observation, laboratory methods in assessing knowledge, task analysis, verbalization of thinking during expert performance, stimulation for performance and training and laboratory studies of skill acquisition (Sudnow, 1978; Chaffin *et al*, 2002; Neilsen, 1999b; Sundin,1997; McPherson, 1994) can distinguish strengths and weakness in acquiring the skills and domain knowledge involved in learning to improvise. Psychometric methods and experimental approaches derived from studies of the development of creativity could also assist in explaining the study of the development of individual creativity, which is an essential part of the present investigation. From an educational perspective, qualitative methods such as case studies and interviews can help to solve problems in seeking the deeper relationships between formal education and musical learning. The following research methodology was adopted for this research (see Table 4.1):

1. Self-case study of an experienced classical musician learning to improvise using planned self-regulated practice and two matched music pieces in classical and jazz genres;
2. Semi-structured interviews with novice and expert improvisers;
3. Experimental work: sight-reading, memorising and improvising as a duo; and
4. Observation and interview study: ensemble rehearsals and improvisation across genres.

Table 4.1: An overview of the research

Phases of Research	Methods	The Purpose
A self-case study of an experienced classical musician learning to improvise using planned self-regulated practice and two matched music pieces in Classical and Jazz Genres	Case Study	(1) Implementing a planned programme of self-regulated practice (2) Seeking to understand the relationship between sight-reading, memorising and improvising (3) Exploring self-regulated learning in a unfamiliar musical genre
Semi-structured interviews with novice and expert improvisers	Semi-structured Interviews	(1) Novice and expert musicians are asked about their reflections on, and attitudes towards, learning to improvise (2) The relationship between formal and informal musical training in relation to developing improvisatory skills is explored
Experiment: sight-reading, memorising and improvising as a duo	Noting practice, memorising and improvising behaviours	(1) To see what happens when classical and jazz specialist musicians work as a duo (2) To note skill development and changes in practice strategies (3) The note the effect of familiar and unfamiliar musical genres in developing improvisatory skills
Observation and interview study of ensemble rehearsals and group improvisation in a multi-genre musical task	(1) Observations of rehearsals (2) Group Interviews	(1) To observe classical and jazz specialist musicians working as an ensemble (2) To note aspects of skill development and changes in practice strategies (3) To note the effects of familiar and unfamiliar musical genres in learning to improvise in an ensemble

4.4 The Development of the Field Studies

The methods used in the research were employed in four phases. Table 4.1 provides an overview of how each phase was designed to consider specific constructs in the development of expertise in music and improvisatory related skills. A range of methods and data collection techniques was used. The first study involved a self case study investigating self regulated learning to improvise over eight weeks from the perspective of a trained classical musician using two specially commissioned musical compositions that were matched in length, harmony and structure, one in the classical genre and the other in jazz (Ockelford, personal correspondence). The second study used semi-structured interviews conducted with novice and expert improvisers concerning their views on improvisation. The third and fourth studies involved more experimentally focused research into sight-reading, memorising and improvising as a duo (study three); and observations and interviews relating to ensemble rehearsals and improvisation with multi-genre style compositions (study four).

4.4.1 Methodological Issues

The focus of the research was to understand how novice and expert improvisers approach their learning and creation of an improvisation, taking account of context, expertise and strategy. The self case study was designed to be able to draw out a comprehensive picture of the complexity of this process of learning and to provide an insightful understanding into individual learning strategies. Additionally, the investigation used interviews to explore the richness and diversity of individual every day experiences in learning to improvise. From a verbal information exchange between the interviewer and the respondents, detailed attention was paid to the opinion, attitudes and reported emotions involved in learning to improvise. The researcher also noted a range of practice behaviours during the observations. The choice of data collection methods was to enable 'the interviewer to be confident that the data will serve her purpose and analysis of them can be duly prepared.'(Cohen, Manion & Morrison; 2000: 278). A semi-structured interview approach can 'prompt' the interviewer to explain clearly any misunderstood questions and provides 'probes' from

the respondents 'to extend, elaborate, add to, provide detail for, clarify or qualify their response...'(Patton, 1980: 238). The interviewing process was seen as a two way communication between the interviewer and interviewee. This was to give the opportunity for the collection of novel ideas and thoughts of the participants. Bearing in mind the issues of spontaneity and leading during the interview, the researcher made sure that the respondents felt comfortable with the environment before the interview process began.

The large ensemble improvisation was undertaken with a group of musicians playing different instruments. The ten-piece ensemble study was designed to understand how musicians with a classical or jazz background worked as a group towards a performance that included improvisation. In the large ensemble improvisation, the researcher used group observation and group interviews. As Watts and Ebbutt (1987) explain, 'such interviews are useful... where a group of people have been working together for some time or common purpose, or where it is seen as important that everyone concerned is aware of what others in the group are saying' (Cohen, Manion & Morrison; 2000:287). Furthermore, group interviews in some way are more practical for time management and the organization of interviewing schedules. The disadvantages of group interviews are the problems associated with accessibility of personal issues because 'the dynamics of a group denies access to this sort of data' (Watt and Ebbutt, 1987). Additionally, it can be difficult to sort out the coding of the data of group interviews (Lewis, 1992).

4.4.2 Validity and Reliability

The various elements of the research were undertaken over a period of time and systematic data were collected 'in order to establish the relevance of the characteristics for the research focus' (Lincoln and Guba, 1985: 219, 310). These enhanced the credibility of the study. The methods used in the study were intended to demonstrate external validity by providing 'rich and layered descriptions from different contexts; i.e. individual, small group and large ensemble, to which the findings can be generalizable to other settings' (Schofield, 1992: 200). At the same time, the methodology included

'setting effects where the data collected presented a function of representative context' (Lincoln and Guba, 1985: 189, 300). In the case study of an expert reflecting on learning to improvise (myself), it was essential to maintain 'ecological validity' by conducting the study in a natural setting. In education research, ecological validity is vital in 'charting how policies are actually happening at the chalk face' (Brock-Utne, 1996: 617) and it provided an opportunity to collect an in-depth range of findings specific to the given context. For the main studies (studies three and four), the multi-method approach illustrated 'methodological triangulation' as it combined individual and group contexts for the collective findings (Denzin, 1970).

4.4.3 Ethics

All research should be ethically sensitive and should not cause pain or indignity to the participants. It is crucial to strike the best balance between the interests of research and a rightful human treatment of people who provide the data (Cohen *et al*, 2000). In addition, the self-esteem of the participants should not be undermined and, therefore, confidences should not be betrayed. When the subject matter of the research is a sensitive matter, the researcher should present the data in a way in which they are 'not so much given as taken out of a constantly elusive matrix of happenings. We should speak of *capta* rather than data' (Laing, 1967:53). *Capta* is expressed as dissemination of data that includes guarantees of confidentiality to the participants. Monitoring data forms the basis of 'a specification of democratic ethics' (Aronson and Carlsmith, 1969). For example, research methods such as action research and experiment are more vulnerable to a betrayal of trust and deception. In the case of action research, researchers could let participants assess their own actions if trust was an issue (Kelly, 1989a). In experimental research, if a deception experiment is the only way to study something of real significance, the truth which has been discovered would be worth the lies told in the process, with an important condition that no harm comes to the subject (Aronson *et al*, 1990). Some evidence has shown that most participants accept the fact that they have been deceived once they comprehend the necessity for it (Festinger and Katz, 1966).

Solutions have been suggested in dealing with deception occurring in experimental research. First, researchers should increase active awareness towards the problem of deception and constantly question the necessity and justification for it. Secondly, if deception has to occur, ways need to be found to counteract and minimize the negative effects of deception problems. For example, the selection of participants needs to avoid letting any individual feel vulnerable. If there are any potential crises that arise with the participants, researchers need to help them work through their emotion about the experience to an appropriate degree. An effective way to counteract the negative effects of research employing deception is to provide reasonable feedback at the end of the research session (Kelman, 1967). The nature of the feedback must be absolute truth. However, there is also risk. Aronson and Carlsmith comment:

> Debriefing a subject is not simply a matter of exposing him to the truth. There is nothing magically curative about the truth; indeed... if harshly presented, the truth can be more harmful than no explanation at all. There are vast differences in how this is accomplished, and it is precisely these differences that are of crucial importance in determining whether or not a subject is uncomfortable when he leaves the experimental room. (Aronson and Carlsmith, 1969: 31)

Aronson and Carlsmith (1969) believe that the most important aspect of the debriefing process is that researchers speak truthfully and sincerely about the reasons for deception and their discomfort at the necessity of using deception to uncover the truth. 'No amount of post experimental gentleness is as effective in relieving a subject's discomfort as an honest accounting of the experimenters' own discomfort at the situation' (Aronson and Carlsmith, 1969: 31-2). The third way in dealing with deception problems is to apply new procedures and techniques. In the situations such as 'as-if' experiments, alternative methods could prove to be effective methods to use. Here, the participant is asked to act as if he/she were a particular person in a particular situation. Whatever format they wish to develop, the new approaches will involve a radically different set of assumptions regarding the role of the participant in this type of research (Cohen *et al*, 2002:65). This approach in dealing with deception problems requires motivation from the participants. It is even possible that this approach might increase

the sophistication of potential participants (*ibid*). The issue of 'deception' arises in the experimental study (see 4.5.3 below for more detail).

4.5 The Research

4.5.1 A self case study of an experienced classical musician learning to improvise using planned self-regulated practice and two matched music pieces representing classical and jazz genres

The purpose of the self case study was to explore the possibility of using planned self-regulated practice during the process of learning to improvise of an experienced classical musician. I myself was the participant. In addition, I carried out a series of self reflective observations over two months on planned daily regulated practice using two music pieces that were matched in length, harmony and structure, one in a classical genre the other in jazz.

My Background

I had been trained classically as a pianist (see Chapter 1), together with some musical background in classical and world music improvisation such as African drumming, Baroque harpsichord music and the Indian Carnatic tradition of music, but with very little formal training in jazz improvisation. In sum, I classified myself as a novice improviser with extensive formal Western classical music training.

The Design of the Planned Self-regulated Practice

In order to be able to find appropriate stimuli to evoke performance in improvisation, I carried out a series of self regulated practices which involved close examination of my practising and performing tasks: (1) reading from notation; (2) memorizing; and (3) improvising. Each practice session evolved into a planned sequence of keyboard music activities that lasted 60 minutes. Practice was followed by a performance using musical notation, then performance from memory, and improvisation. Table 4.2 sets out the

nature and order of these activities. The process and outcomes were recorded; both musical and psychological.

Table 4.2: The design of the planned self-regulated practice

The Sequence of Planned Self-regulated Practice	Cognitive Tasks	Practice Time (Minutes)	Task Performance
Opening 10 minutes	Sight-reading Memorizing	3.5 6.5	(1) Sight-reading (2) Memorization (3) Improvisation
10-20 minutes	Memorizing	10	Memorization
20-30 minutes	Memorizing	10	Memorization
30-40 minutes	Memorizing	10	Memorization
40-50 minutes	Memorizing	10	Memorization
50-60 minutes	Memorizing Improvising	2.5 7.5	(1) Memorization (2) Improvisation

The planned task performance in the sequential model was to enable description and analysis of the behaviours and characteristics of learning during each process. The purpose was to identify the different psychological functions involved during learning to improvise within these two different musical genres. By using known stimuli in a range of tasks, it was expected that it would be possible to detect detailed outcomes during the process. Also, by implementing a deliberate and controlled musical element as part of the case study, it would be possible to map out some of the complex psychological relationships involved in the continuity of the learning process.

The Design of Self Reflection Observations

I practised memorizing and improvising daily, spending two hours each day on the two stimuli and each day I varied the order of these two foci. I usually started with the more familiar genre, the Western classical piece. After each practice session, I wrote

down all the activities in my practice dairy and recorded my thoughts by verbalizing into an audio recorder. I continued this routine for eight weeks.

The Music Stimuli

The music stimuli were two commissioned keyboard compositions in a Western classical and jazz idiom that were matched in length, harmony and structure, in 4/4 meter, and especially composed for memory-related experiments (Ockelford, 2007). In addition, both included chromatic features and events which were specifically designed to require accurate performance. The musical notations are shown in Figures 4.1 and 4.2. Both musical works were unfamiliar to the participant at the onset of the research.

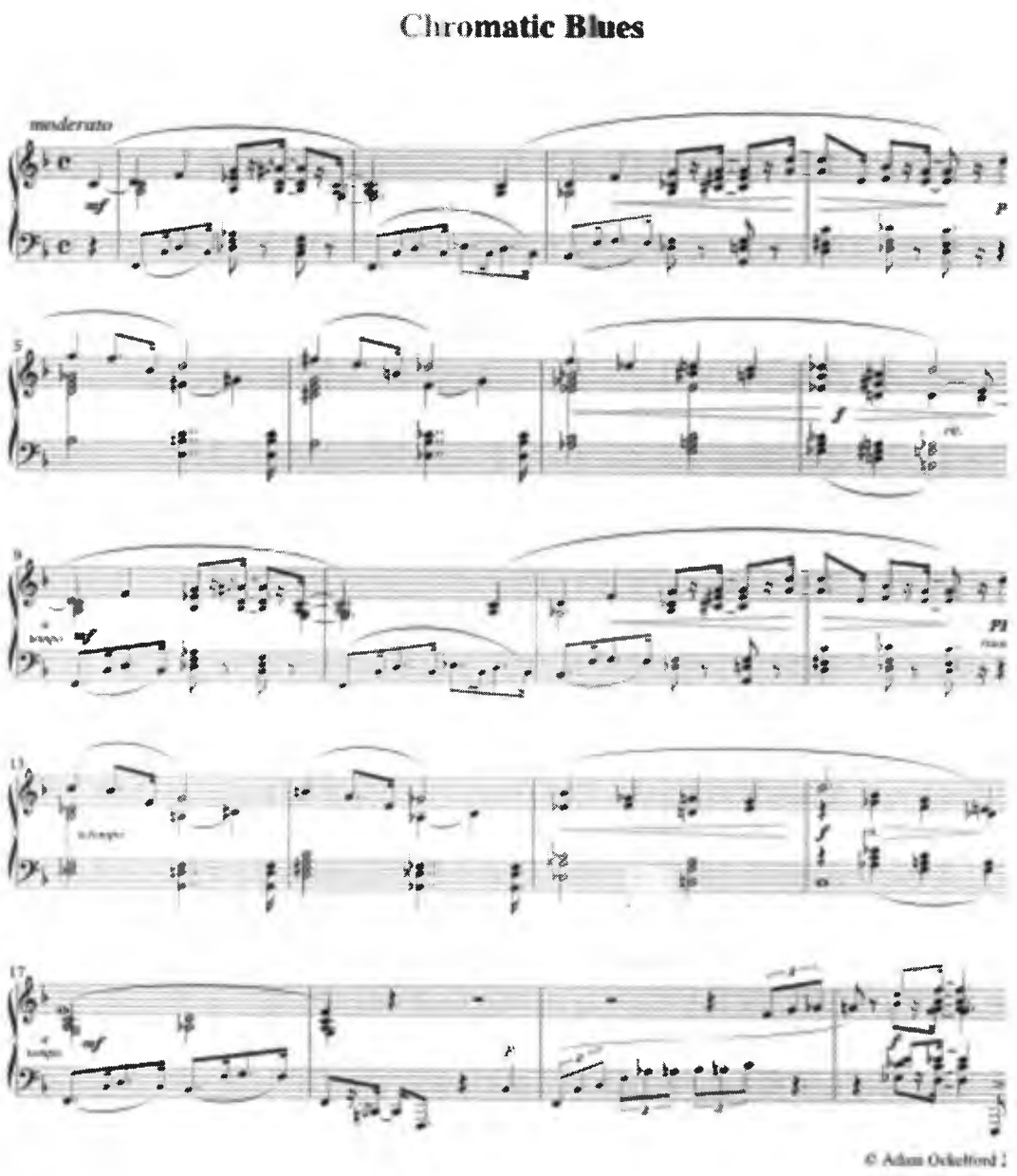

Figure 4.1 The jazz music piece 'Chromatic Blues' used in the self case study

Chromatic 'Classical Theme'

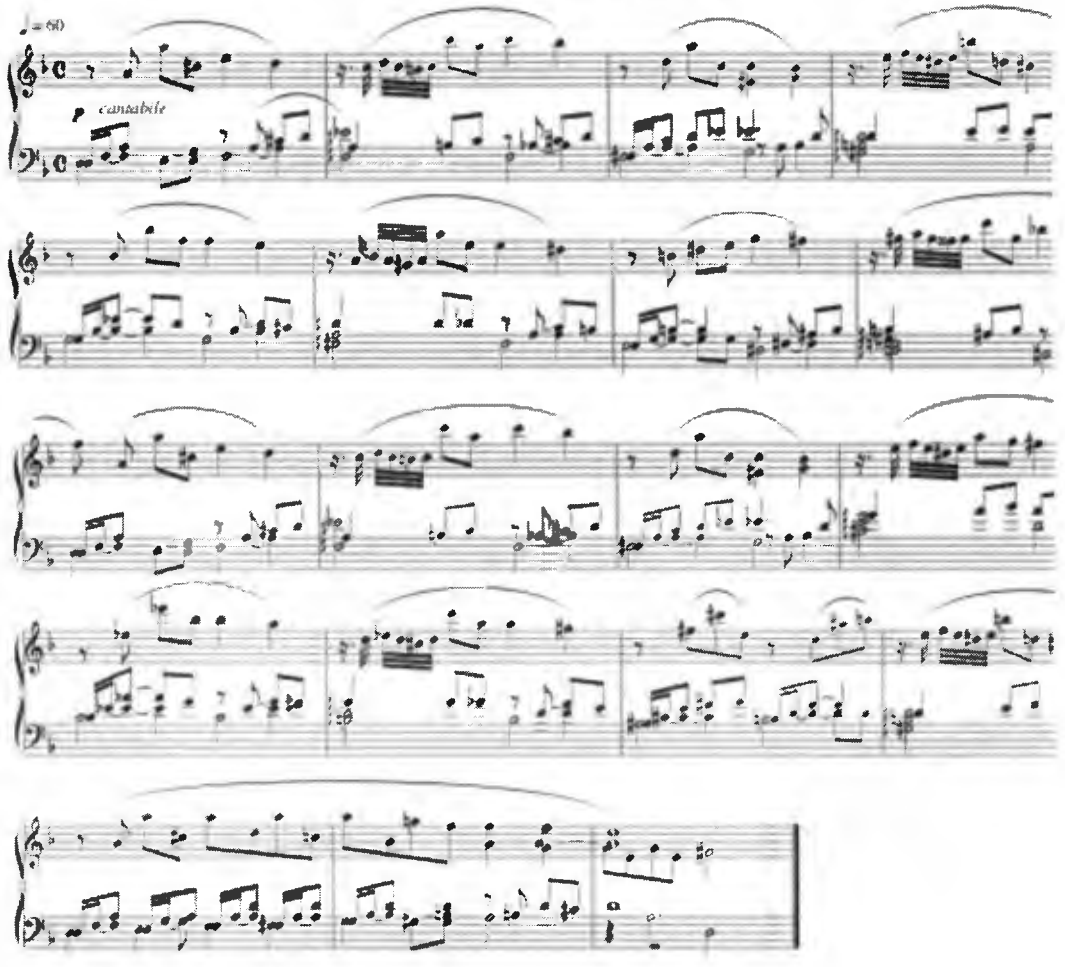

Figure 4.2: The classical music piece 'chromatic classical theme' that was used in the self case study

Procedure

In the research, I performed on an upright Yamaha piano. The planned self-regulated practice data were collected on a Sony MIDI digital recorder which was placed at an appropriate distance between the piano and myself. I practised on a Roland electronic keyboard with a sampled piano timbre and performed on an upright Yamaha piano. I used the electronic keyboard with a headphone adjusting volume to my preference.

The music notation data from practising and performing were collected on a PC using a MIDI sequencer and Sibelius programmes. The Sibelius program facilitated the capacity to record the exact musical movements during the practice and task sessions. These were transcribed to musical notation to show the deliberate practice for memorization, the performance of the tasks and the relationship between memorization and improvisation. All of the practice and task sessions were also videotaped on a Sony digital camera recorder. In addition, I recorded eight weeks of my aural and visual learning process. I observed and tested myself on the ways in which I learned to memorize and improvise in two contrasting musical styles – jazz and the Western classical tradition.

4.5.2 Semi-Structured Interviews with Novice and Expert Improvisers

Semi-structured interviews were conducted with expert and novice musicians from a classical and jazz background. The aim of the interviews was to uncover the expert and novice musicians' reflections about and attitudes towards learning to improvise. In addition, the interviews also investigated any perceived relationship between formal and informal musical training in relation to the development of improvisation skills. The ages of the musicians (n=20) ranged from 25-65 years. The interviewees were specialist teachers working in music conservatories, primary and secondary school music teachers, professional musicians and academics working in the field of music education. Each interview lasted between 20 and 55 minutes.

The nature of this research meant that the type of response mode was important and needed to be decided on before the actual interviewing procedures. In relation to data analysis, using an appropriate type of response mode can enable 'the interviewer to be confident that the data will serve her purpose and an analysis of them can be duly prepared.'(Cohen, Manion & Morrison; 2000: 278) When considering the order of questioning, the type of the questions, the respondent's mind and mental template and question phrasing were considered in the design of the exploratory interview. The

interview questions aimed to be clear and to develop an effective rapport with the interviewees. At the same time, the schedule provided a non-directive approach during the interviews. The questions explored early training in aural and notated musical abilities, the very first contact with improvisation, early musical experiences in improvisation, e.g. from churches, or school music club. Additionally, the interviewees were asked about the development of different musical abilities related to improvisation throughout their childhood and teenage years. There was also a discussion of the ideology of improvisation and spontaneous creativity and its perceived relationship to musical memory.

Table 4.3: The interview questions on improvisation

The Interview Questions
• How do musicians learn to improvise?
• What is the learning process?
• How long does the learning process take?
• The learning process during the training year – is this still continuing?
• What do musicians do differently now compared with their past training and experiences?
• What is the transformation for the learning process through past formal and informal learning?
• Do musicians improvise in different styles?
• How do they feel when they improvise in a different style?
• How do musicians learn to improvise in a different style?
• What are musicians' emotions in learning to improvise in a different style?
• What is the role of memory in learning to improvise?
• Do musicians think that they need improvised memory skill to improvise?
• If so, what kind of memory skill?

All the interviews were recorded on a Sony Mini Disk audio recorder with a microphone attached to it. When the audio recorder was recording each interview, the volume of the sound was tuned to the minimal level in order to capture clear sound when listening and analysing the interviews. 20 samples of in-depth semi-structured interviews with novices and expert musicians from a Western classical or jazz musical

background were recorded. As mentioned above, each sample lasted between 20 and 55 minutes. The interviewees were contacted by either e-mail or telephone to arrange the interviews. Most of the interviewees were UK based so suitable times could be easily arranged. Initial contacts suggested that there were limited numbers of expert classical improvisers. During the primary arrangements for the times and places, the researcher stated her intentions and proposals for interviews. The interviews took place in a range of convenient venues. Each interview began with a formal introduction by the researcher followed by the planned interview questions (see Table 4.3).

4.5.3 The first experiment: Sight-reading, memorising and improvising as a duo

The tasks were designed to explore how Western classical and jazz musicians worked as a duo, and whether there was evidence of transferred musical skills and applied practice and learning strategies in a planned sequential model. In addition, the following skills were also a focus: (a) learning to sight-read; (b) performing a sight-reading task; (c) learning to memorise; (d) performing a memorizing task; and (e) free improvisation in a small group context. This involved several elements following each other during a specific duration of time (see Table 4.4). Two classical and two jazz musicians were selected to participate in this element of the research. Each duo combination consisted of one Western classical and one jazz musician. Additionally, the tasks used two notated pieces of music, one Blues style and one in a more Western classical genre (see Figures 4.3 and 4.4 below).

Table 4.4: The duo tasks

Elements of the Experiment	Description of the Experiment
Element 1	Small group practice in reading the music piece, followed by performance of the piece
Element 2	Small group practice to memorise, followed by memorisation task performance
Element 3	Free duo improvisation

Participants

Four participants took part in Element 1. Participants X and Y were both professional jazz musicians who had been active in the London jazz scene for a number of years. Both were trained classically in school up to A-level of music and changed to specialise in jazz when they entered music conservatories. Additionally, both of the jazz specialist participants were composers and bandleaders as well as instrumentalists. The other two participants O and P were professional classical musicians who had worked respectively as a violinist and flautist (and an Irish flautist) in professional orchestras, string quartets and who had taken part in World music practice. As might be expected, comments from the jazz specialist participants suggested that were more advanced improvisers than the classical specialist participants. All the participants volunteered to participate in the experiment.

Equipment

In the experiment with participants X and O, there was an initial duo practice followed by the task performances. These were recorded using a Sony digital camera recorder and a Sony MINI audio recorder with a microphone attached. The participants used their respective instruments (a trumpet and a flute) in the duo practice and for completing the tasks. For the experimental session with subjects Y and P, all the duo practices and task performances were similarly recorded on a Sony digital camera recorder. Participants Y and P used a Steinway grand piano and violin respectively in the duo practice and performing tasks.

Design of the Experiment

Elements 1 and 2

The design of Elements 1 and 2 involved two levels of testing, namely (a) the preparation for a task and (b) the actual task performance. At the first level, both participants were given two unknown pieces of notated music and were able to choose the amount of time to practise them. The participants practised in the same room for

this preparation. After the preparation, each participant performed the music individually in the presence of the other participant. Each participant decided on the order of the music that he or she wished to complete first. The task conditions of Elements 1 and 2 were minimal in order to reduce anxiety in carrying out the task performance.

Element 3

After completing the practice and memorisation task in Elements 1 and 2, each participant was given as much time as they felt was necessary to prepare for the duo improvisation. When they felt comfortable enough to undertake the task it was recorded using a video digital camera. The time duration to prepare duo improvisation was according to each participant's preference. In both duos, minimal instructions were given for performing a free group improvisation. The amount of preparation time was subject to the participants' preferences. In addition, participants were also told that they could choose the style of the group improvisation.

The Stimulus Material

Figure 4.3 and 4.4 show the two especially composed musical pieces. Both were short melodies having nine bars of (right hand) melody. The short melody in Blues was taken from a practice piece for woodwind instruments of a standard Blues Study Collection. It had 63 notes for the right hand. The other short melody was in classical style and was specially commissioned for the study 'Chromatic Classical Theme'. It had 56 notes for the right hand.

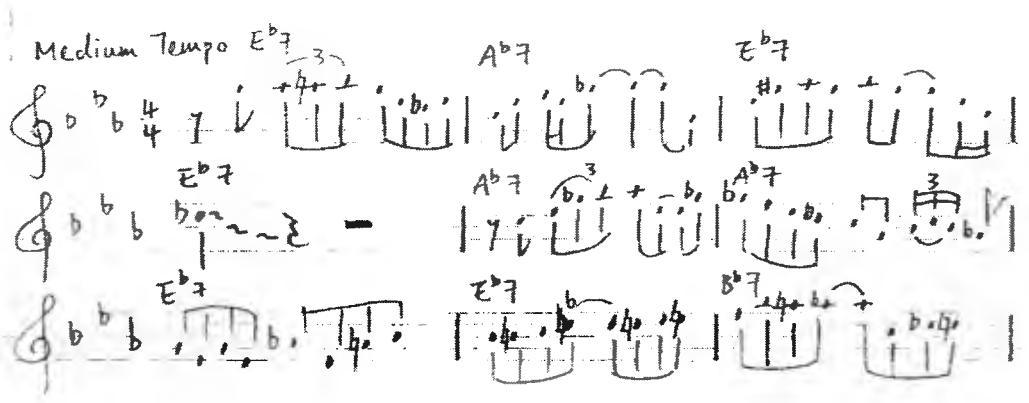

Figure 4.3 The visual stimulus in Blues style

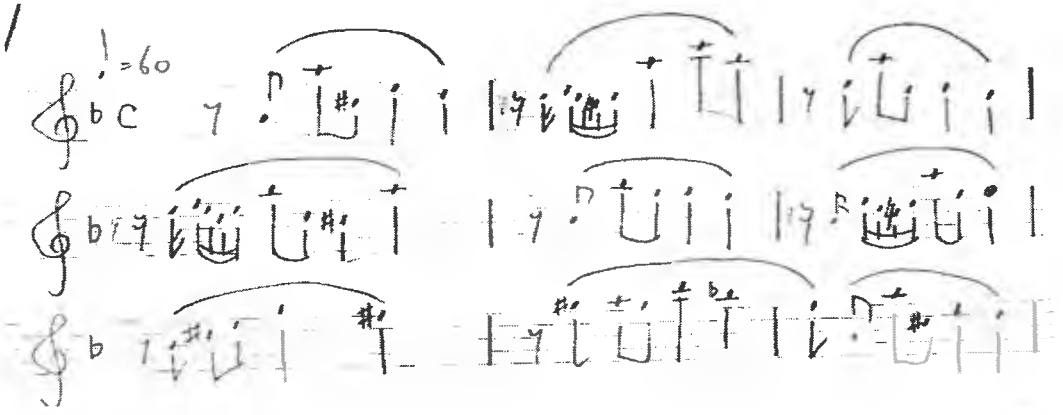

Figure 4.4 the visual stimulus in Classical Style

The Procedure and Process

Elements 1 and 2

In preparation for performing the tasks, all of the participants were allowed to practise for as long as they liked. When they were ready to perform the task individually, the leader of the duo gave the researcher an indication that they were ready. In duo 1, participant O needed more time for the preparation and so participant X waited until they were ready to complete the task. While waiting for participant O to be ready for the task performance, participant X continued to practise more. A similar situation occurred in duo 2. The small group practice for the sight-reading task in duo 1 took place in a private practice studio. For duo 2, it happened in a jazz performance venue.

During the performance, participant X of duo 1 started to perform the music reading task while participant O was also in the same room and listened to the task performance. These were carried out in a private practice studio. A similar procedure took place with the other duo in a jazz performance venue.

Element 3

In duo 1, the participants X and O decided to use a D minor scale and the D Phrygian modal scale as the basic harmonic structure of their free duo improvisation. In addition, participant X named the specific notes in the harmonic structure for participant O to remember for improvising. It took participant X and O two takes (start and stop) to complete the free duo group improvisation.

Duo two started by having a discussion about the style of the free duo improvisation. Participants Y and P first decided that the style and the length of their group improvisation would be about three minutes long and that it would be in a contemporary classical style. After this short discussion, duo 2 started to improvise freely straight away as the participant Y opened up a chord on the piano and participant P listened to the chords and began to improvise a melody line on the violin. During this particular procedure, one of the participants suddenly lost confidence in completing the duo improvisation performance task. The researcher had to step in and explain the purpose behind this particular experiment. She resumed and completed the task after having been assured by the researcher of absolute confidentiality.

4.5.4 Observation Study: Ensemble rehearsal and improvisation performance with multi-genre composition elements

Participants

Fourteen classical and jazz musicians took part in learning to improvise for a specially commissioned large ensemble musical work rehearsal series that took place over a period of two months. Nine of the musicians were specialists in jazz performance and worked as professional players in the London jazz scene. Five of the musicians were experts in classical performance, but had some experience in the Irish folk music

tradition or other world musical improvisation. These fourteen musicians formed a large ensemble group for the research study and decided to call themselves 'Fringe Magnetic Ensemble'. RS, the composer who formed the group, became the ensemble leader who led, conducted and directed all the rehearsals. The ensemble was male dominated, as twelve of them were males with only two females. The instruments in the ensemble were trumpet, flugelhorn, piano, clarinet, flute, bass clarinet, violin, cello, double bass, drums and percussion (see Chapter 7 for details).

Table 4.5: An overview of numbers of instruments and the descriptions of instrumentation

Rehearsal Sessions	Numbers of Instruments	Instrumentations represented
1-6	9	Trumpet, flugelhorn, grand Steinway piano, clarinet, bass clarinet, flute, violin, cello, double bass and drum kit
7 & 8	9	flugelhorn, grand Steinway piano, clarinet, bass clarinet, flute, violin, double bass, drum kit and percussion
9	7	Trumpet, flugelhorn, grand Steinway piano, bass clarinet, cello, double bass, drum kit and percussion
10&11	8	Trumpet, flugelhorn, grand Steinway piano, bass clarinet, flute, cello, double bass, drum kit and percussion

Equipment

All of the ensemble rehearsal sessions were recorded on Sony digital camera recorder. Sessions 1- 6 were also captured on a Sony MIDI disk player and Sony tape recorder. The ensemble improvisatory performance was recorded on a Sony Mini Disk audio recorder. The details of which instruments were used in each session are given in Table 4.5.

Design

Each musician was required to learn and perform an individual improvisation as well as a group improvisation for the commissioned musical work. The written notation of the commissioned composition was taken away from the participants when each rehearsal session ended.

The Music

The specially commissioned musical works[1] were designed as unfamiliar music stimuli. Its style was free jazz, a musical form without boundary that would enable novice improvisers to improvise in a group without prior knowledge of the jazz genre. The music stimuli were especially commissioned for jazz and classical musicians performing composed and improvised music together as an ensemble (see extract in Figure 4.5). As the ensemble featured musicians from various backgrounds, with experience in jazz, classical and folk genres, the composer tried to utilise all of these different elements in the compositional writing. The music also included heavily composed sections with open and structured forms and loops. Elements of improvisation were approached within the music with three different techniques: improvisation over 'changes', improvisation using thematic material and free improvising. The specially commissioned composition had elements 'Little Boban', 'You Count Centuries (I Blink My Eyes)', 'Round-abouts', 'Tall Stories' and 'Baron and Bump'(see Appendix). The music was inspired by 20th century and contemporary classical composers such as Messian, Bartok, Reich and Stravinsky; and jazz influences were included from the Knitting Factory (Tim Berne, Ellery Eskelin, Dave Douglas) and ensembles such as Charlie Haden Liberation Music Orchestra, Food and Julian Arguelles Octet.

Sessions

Eleven sessions of rehearsals were recorded on a digital camera. Each lasted between 50 and 70 minutes. Out of a total of eleven sessions, three rehearsal sessions were

[1] In total, there were five short pieces created for the group improvisation. Data was collected on all five in the analysis of their overall musical behaviours (Chapter 7) and from three of the five for an analysis of the actual improvisations (Chapter 8). These three pieces were selected subsequently for analysis because they demonstrated the greatest contrasts in improvisation.

captured on a Mini Disk recorder and another three on a tape recorder. In addition, five group interviews were filmed each lasting between 15 and 30 minutes

The Procedure

The study was inspired by the previous studies and interviews with novice and expert musicians. The researcher began to search for a composer who would be willing to be commissioned to write a piece of music which entailed both composed and improvised musical features and at the same time would accommodate both classical and jazz musicians working together as a group. He was identified in the semi-structured interviews and had just started working professionally as a composer and a jazz trumpeter in London. I asked whether he would be interested in writing a composition which included both jazz and classical features and at the same time included composed and improvisatory elements. He was attracted to the idea, both as a concept and financially, therefore the answer was positive. He started to write for the original large ensemble work immediately and set about finding suitable players to perform his work. As he was already very active in the London Jazz scene, he was able to find the most appropriate jazz players to work on this project. He also knew some very able classical musicians. The first discussion took place in January 2006 and, after several meetings and further discussions, he began to work on his composition and finished the whole ensemble composition in March.

Figure 4.5: Part of the score for 'Tall Stories'

Rehearsal Sessions

The rehearsals took place in the prestigious London Jazz venue, called 'The Vortex'. Each rehearsal session started at 10 am and ended at 3pm each day, the total group practice hours in each day was between three and five hours on average. The musicians had not worked together as a group before; therefore this was a completely new experience in terms of the social structure of the ensemble, the music and the improvisation. For instance, one of the classical musicians had never improvised with a large group such as the ensemble before. The composer, also the conductor of the ensemble, constructed the organization of each rehearsal based on criteria such as getting to know the work, technical problems and performance related issues. The time duration of the rehearsal sessions was from March to May 2006.

4.6 Summary

A multi methods approach was applied in the research that was classified into four phases. Each element in the phases was designed to consider specific constructs in the development of expertise in music and improvisatory related skills. A range of methods and data collection techniques was used in each phase. The first phase involved a self case study implementing deliberate self regulated practice based on a planned sequential model: (a) sight-reading; (b) memorising; and (c) improvising over eight weeks with a trained classical musician. Additionally, the self case study used two commissioned musical compositions matched in length, harmony and structure, one in the Western classical genre the other in jazz. In the 2nd phase, semi-structured interviews were undertaken with novice and expert improvisers concerning their perceptions about improvisation. The final two phases included experiments that investigated learning from sight-reading, memorising and improvising, first with two mixed genre duos, followed by observations and interviews relating to ensemble rehearsals and improvisation with multi-genre compositions. Table 4.6 sets out an overview of all the

data collected. Chapter 5 reports the findings from the self case study of self-regulated learning.

Table 4.6 An overview of data collection within the research

Phase of Study	Samples
A self case study of an experienced classical musician learning to improvise using planned self-regulated practice and two matched music pieces of different genres	(1) 22 audio and video samples of practice sessions (2) A diary of reflections on the learning process (3) A record of skill development and changes in practice strategies
Semi-structured interviews with novice and expert improvisers	(1) 20 Samples of recorded interviews (20-55 minutes)
An experiment considering the role of memorisation and improvisation	(1) 18 audio and video samples of duo practice and performance
An observation and interview study of a group context for improvisation	(1) 11 audio and video samples of ensemble rehearsals and performance (50-70 minutes) (2) 5 audio and video samples of group interviews (15-35 minutes)

CHAPTER FIVE:

SELF –REGULATION AND LEARNING TO IMPROVISE

5.1 Data Analysis

5.1.1 Analysis of DVD Data

Chapter five is concerned with the data analysis from a case study and semi-structured interviews in relation to self-regulated learning to improvise. The case study was based on an experienced, classically trained musician learning to improvise using especially composed written music stimuli in two contrasting musical genres. I collected and transcribed twenty-two samples of films with entries from practice dairies. Each sample lasted between 35 to 60 minutes. I focused on the events that happened during practice sessions and assessed any significant changes that took place. In the process of analysing the video data, I chose the analytical method of iterative refinement cycles suggested by Lesh and Lehre (2000). In this process, the researcher begins to telescope analysis on all the data. The researcher first looked at all the video sessions. After watching all the footage, the researcher concentrated on a small number of chosen

sessions and uses analytical concepts such as expertise theory to examine significant factors derived from the data.

5.1.2 Analysis of Interview Data

The researcher (as novice improviser with a Western classical music background) undertook a reflective evaluation after each practice session. This was complimented by a semi-structured interview with an expert improviser who had a jazz musical background. The goal of the reflection and interview was to uncover the musicians' attitudes and approaches towards self-regulation in learning to improvise. In particular, the expert interview focused on the strategies that the professional musician used during solo improvisation performance. The intention was to provide a comparison with the data from the self case study.

Iterative Process

Both the DVD and interview data were analysed using a process of iteration that was devised by Cooper and McLntyre (1993) to identity emerging themes. The process included:

- Reading samples of transcripts from videos and interviews;
- Distinguishing similarities and difference from the transcriptions regarding the research question;
- Building theories based on emergent themes relating to the research question;
- Examining theories adjacent to a new sets of transcripts;
- Assessing new theories alongside the existing transcripts which have previously been dealt with;
- Transporting all the existing theories forward to new transcripts;
- Repeating the above procedure until all relevant data have been analysed and all theories have been assessed.

5.2 Emerging themes and Subcategories

The themes emerging from the data were skill development, knowledge acquisition and practice strategies. Within each theme, there were subcategories. The first theme is divided into five sub categories; physiological adaption, automaticity, reading music skill, the role of developing aural schemata, automaticity and musical memory. I analysed the level of automaticity in these skill developments during practice sessions as well as assessing the development of my musical memory in relation to the given stimuli. The second theme practice strategies included three sub-categories, memorization strategies, analytic strategies and improvisation strategies. In each sub-category, a detailed analysis was made of how each type of strategy was implemented and a note was made concerning the kind of impact they made on the development of existing and newly learned skills and knowledge from the given stimuli. For instance, in memorisation strategies, I analysed the strategies that I used during the practice sessions and the results of the memorisation task, as well as the development of my aural schemata in relation to the strategies' application. For analytic strategies, I looked for a deeper approach within the practice strategies that I had utilized during each session. At the same time, I analysed each practice strategy in relation to improvisation and recorded the impact that each improvisation practice strategy had on the tasks.

5.3 Physiological Adaptations

5.3.1 Developing Physiological Adaptation in Learning a Classical Music Piece

When I started to practise the Classical piece, I had difficulties the first time, particularly the ornaments and spread chords in the bass accompaniment. The problem that I experienced with the ornaments was getting used to the figuration. Similarly, my hands were physically challenged to fit around the spread chords. In addition, the section from bars twelve to sixteen was another difficult area.

"I have found ornaments and spread chords in the bass accompaniment harder to play, particularly bar twelve to bar sixteen which needed to be played a few times to feel comfortable."
(Session Two)

After the practice in session one, there was an increase in familiarity with some of the musical features of the piece. However, my physical adaptation for the entire piece was still minimal.

"I felt that more familiarity was established within the musical features, but not enough. I still feel awkward playing most of the piece." (Session Three)

After the third practice session, there was very little progress on my physical adaptation to playing the piece. However, the difficulty was reduced to bars 15 and 16. As a result, I concentrated on practicing the ornaments in bar 16 (see figure 5.1)

"Ornaments and spread chords in bars 15 and 16 were the most difficult features to become fluent in." (Session Four)

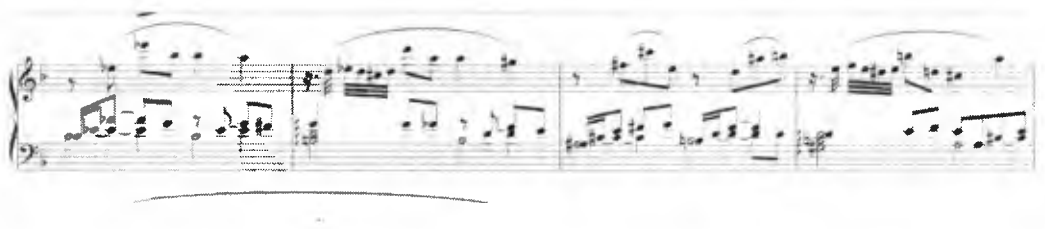

Figure 5.1 Bars 13-16, the difficult section for physiological adaptation

After the fourth and fifth practice sessions, the difficulties in my physical adaptation to the piece were reduced mainly to the ornaments. Additionally, I spent most of the time achieving high fluency in my physical adaptation when I played the ornaments. In addition, Figure 5.2 illustrates how I went about practising the ornaments.

"Ornaments become more fluent after repeating them several times. I have spent a large amount of time on the ornaments." (Session Five)

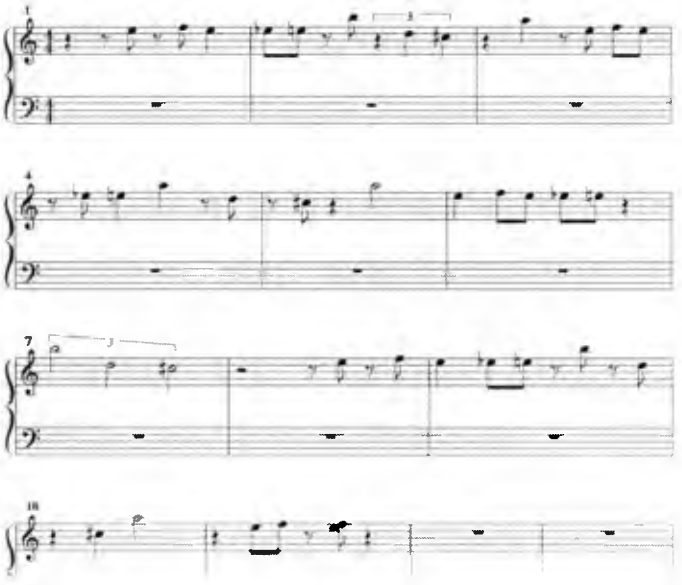

Figure 5.2: The music transcript of the practice session five

5.3.2 Developing Physiological Adaptation in Learning a Jazz Piece

At the very beginning of my practice of the piece in jazz style, the chromatic chords in bars 6 and 8 (see figures 5.3 and 5.4) were difficult to play on the piano in terms of physical adaptation. These chromatic chords demanded large stretches in the hand positioning on the keyboard.

"I physically felt it was difficult to play bars 6 to 8. I have to stretch my hand hard every time I play those bars. It felt uncomfortable." (Session 1)

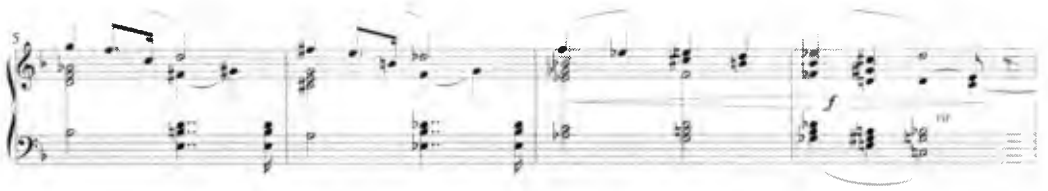

Figure 5.3: The chromatic chords in bars 6 and 8

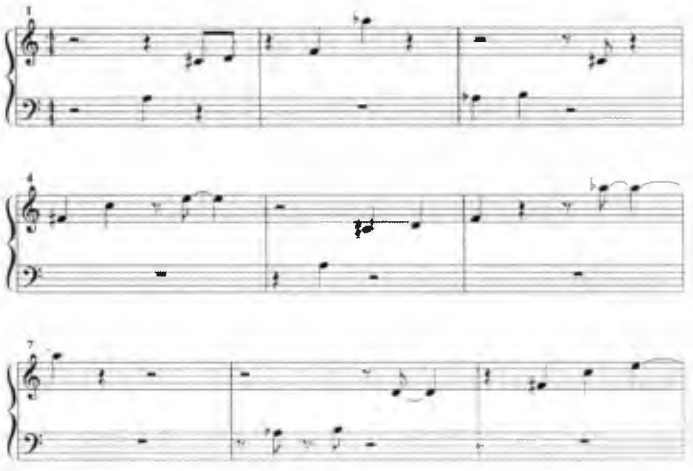

Figure 5.4: The music transcript from practising chromatic chords in bars 6 and 8 in session 1, DVD ex 1

However, I started to feel more at ease with the rest of the piece. As I continued to practise, I managed to play through the whole piece at a slow speed. The difficulties that I had experienced in sessions one and two decreased, and I was able to play the whole piece through several times during the practice sessions 3 and 4. After the fourth practice session, I began to be able to establish fluency in playing through the music, as my hand positioning was getting used to stretching for the difficult chromatic chords. In the fifth practice session, I started to feel the beat of the bass line and tried to implement a 'stylistic groove' in the rhythm.

"I started to be able to play the piece at a much faster speed."

(Session Nine)

"I felt more at home in playing the given material. I started to establish the flow of rhythm and bass line."
(Session Ten)

5.3.3 Comparison of Physiological Adaptation Development in Learning the Classical and Jazz Pieces

Comparing the development of physiological adaptations in learning to play the two pieces (classical and jazz), greater difficulties were encountered in learning the jazz music piece. The physiological adaptation for the jazz piece was developed at a much slower speed compared to learning the classical music piece. As figures 5.5 and 5.6 suggest, after five practice sessions, the difficult bars that I had originally experienced at practice session one were reduced to four bars. I still felt awkward playing bars 7, 8, 12 and 13.

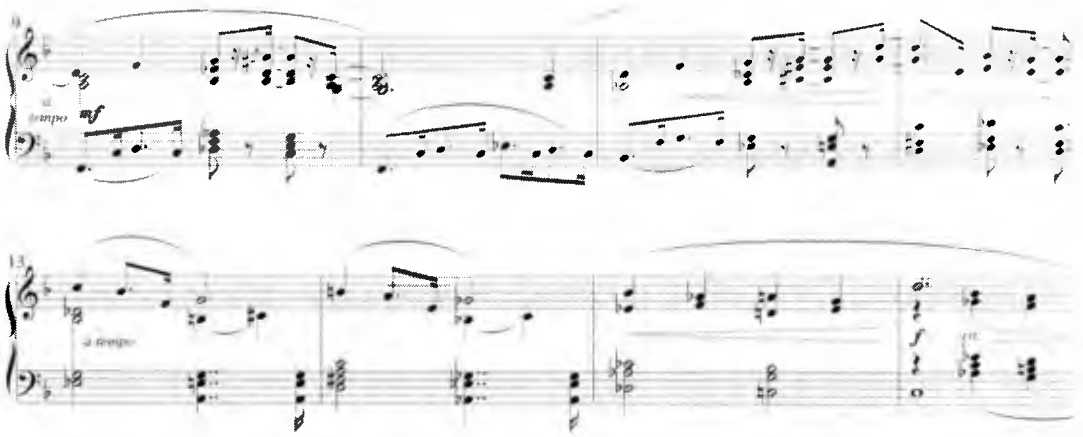

Figure 5.5: Jazz piece original - Bars 9 -16

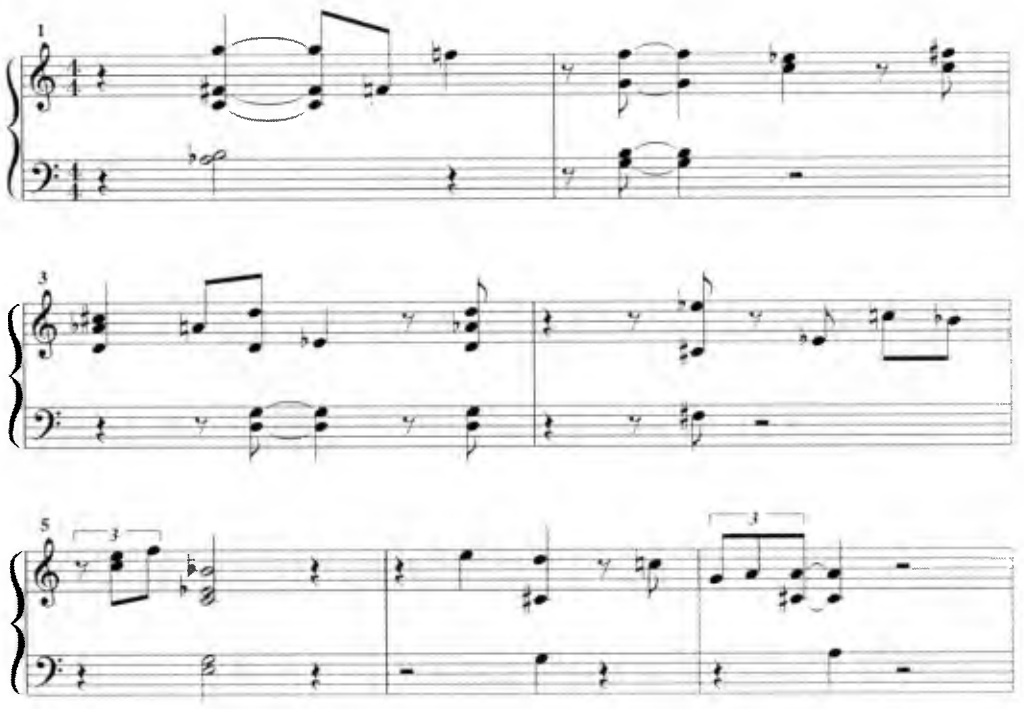

Figure 5.6: The music transcript from practising bars 7, 8, 12 and 13

The development of the physiological adaption in learning to play the classical piece 'chromatic classical theme' was significantly different from the jazz music piece 'chromatic blues'. I found it relatively easy to acquire the physiological adaption for the 'chromatic classical theme'. By the end of the fifth practice session, I only found the ornaments uncomfortable to play. Compared to the jazz music piece 'chromatic blues', the rate of reducing difficulties was considerably faster. For example, comparing practice session 3 of the classical piece to session 3 of the jazz piece, the numbers of difficult bars encountered in developing a physiological adaptation to the unfamiliar genre was three times greater than with the familiar genre. For learning to play in classical and jazz genres, the development stopped at the fourth practice session where both pieces had a small number of elements that continued to challenge.

5.4 The **Music Reading Skill**

5.4.1 Developing Reading Music Skills in Learning a Classical Music Piece

As I began to practise the classical piece, I read the music at a slow speed. As I progressed to practice session three, the speed of my reading began to change from one note at a time to half a bar at a time. I noted that I deliberately made myself read faster. As the amount of practising increased, so did the level of familiarity. However, in practice session four, my speed for reading music decreased to one note at a time. The speed of my reading the music notation from practice session three was not sustained through to session four.

> "I read one note at a time when I was practising. Somehow I didn't think I could achieve what I did in the previous session." (Session Four)

In practice session five, I read one whole bar at a time (see figure 5.7). As the amount of practice time increased, I began to establish a higher level of familiarity within the musical stimuli.

> "I started to scan in my music reading. I read one bar at a time." (Session Five)

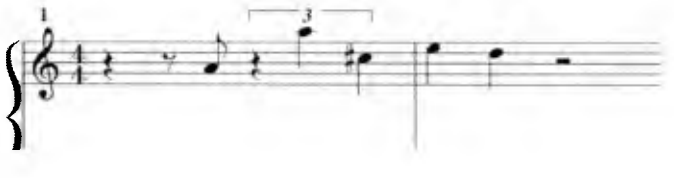

Figure 5.7: The music transcript of reading one bar at a time in session five

5.4.2 Developing Reading Music Skills in Learning a Jazz Piece

As I started to read music notation in jazz during practice session 3, my skill in reading music decreased to a much more basic level. I read note after note at a slow speed when I first began to learn to play the jazz style keyboard composition. After I had read for three hours intensively, I noted that I had started to read half a bar at a time. "I concentrated on reading half a bar at a time." (Session 3)

However, it was difficult to make progress with my reading music skills due to a lack of confidence with an unfamiliar musical style. During the fourth practice session, I was still reading one note at one time. My skill remained the same after the 4th and 5th practice session (see DVD ex 2, example figure 5.8). "The level of skills at reading music stayed at the same level as in the previous session." (Session 4)

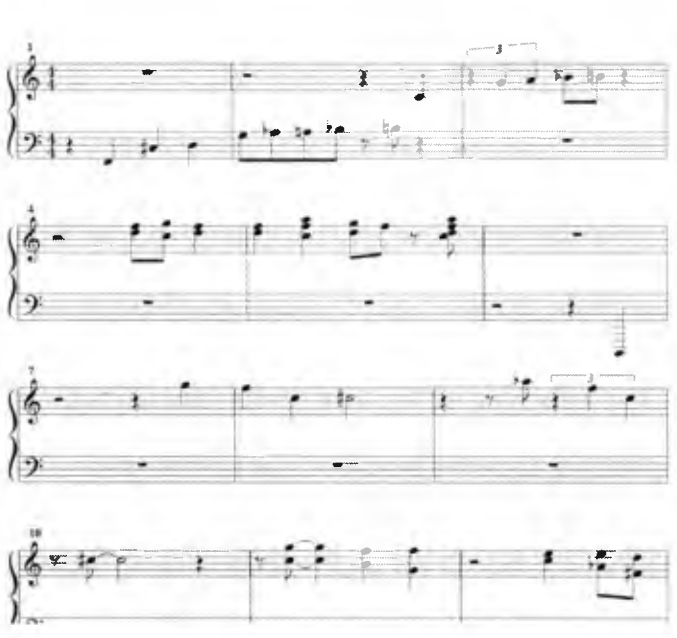

Figure 5.8: The music transcript of practising reading music skills in session 4 using the jazz piece

5.4.3 A Comparison of Reading Music Skill Development in Learning Classical and Jazz Music Pieces

In learning to play the classical music piece, I began by scanning one bar of a time at a slow speed during the first practice session. Gradually, I was able to scan one bar at a moderate speed. However, I did not manage to scan more than one bar by the end of the fifth practice session (see Figure 5.9). This might have been influenced by the length of the phrases in the classical piece - this was predominately made up of one bar phrases.

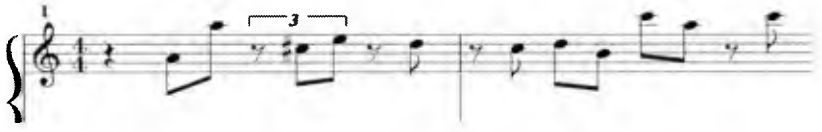

Figure 5.9: The music transcript of the development of reading skill in fifth practice session

During the first practice sessions with the jazz music piece, I concentrated on one note at a time at a very slow speed. I was struggling to read any faster during the second and third practice sessions. Eventually, and with great effort and more time spent on practising, after the fifth practice session, I was able to scan one bar at a time (see Figure 5.10).

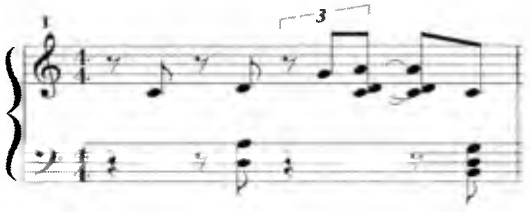

Figure 5.10 the music transcript of the development of reading skill in the first practice session of the jazz piece

The difference in reading music between practice sessions 1 to 5 across the two pieces was quite different, which suggests that my reading music skill reduced to a basic level in the self-regulated learning to improvise in an unfamiliar musical genre. This

remained constant in a comparison of all of the practice sessions between the classical and jazz music pieces. The similarity shared in self-regulated learning with familiar and unfamiliar musical genres was the improvement in acquiring reading music skill. For the 'Chromatic blues', my reading skills improved from fixating on one note to one bar. In 'chromatic classical themes', my reading music skills improved from fixating on one bar at a slow speed to scanning quickly one bar at a time.

5.5 The Role of Auditory Feedback in developing aural schemata

5.5.1 Developing the use of feedback in learning to a classical piece

My use of aural feedback was not well established during the first practice session with the classical style stimuli. I needed more time to develop an 'aural schemata' for the piece and had to listen to the extracts until I had achieved it.

> "The feedback role was not established as the piece was still fairly new to me. I did not feel my listening ability was ready to provide significant auditory feedback." (Session One)

My knowledge of the sound of the top right hand melody in bars 1 to 4 started to make an impact on my practice in the second practice session (see figure 5.11).

> "I consciously listened out for the top right hand melody line in bars 1, 2, 3, and 4." (Session Two)

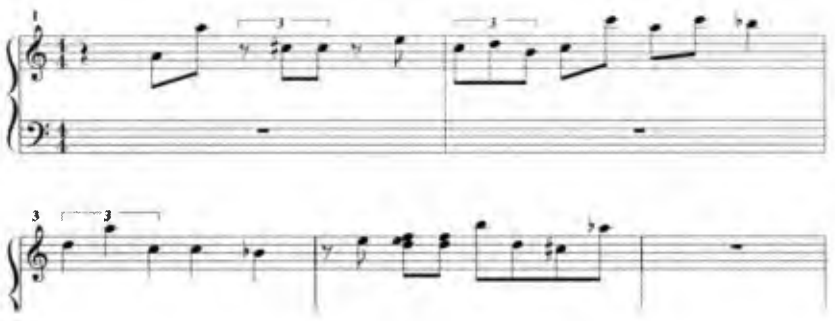

Figure 5.11: The top melody line in bars 1, 2, 3 and 4 of the classical piece

In practice session three, I began to feel greater benefit from the auditory feedback and it helped in the memorisation task. "I had more confidence from the auditory feedback." (Session Three)

I continued to use the auditory feedback to help my memorization task in practice session three. At the same time, the increasing amount of time spent on listening to the stimuli assisted my long-term memory.

> "When I was doing the memorisation task, I started to remember what I heard rather than what I read." (Session Four)

After the fifth practice session, the impact from the auditory feedback had reinforced positively the memorizing and improvising task. This was shown by increased numbers of notes remembered in the last memorizing task. Additionally, the outcome of the improvisation task demonstrated increased usage of the already established auditory feedback.

> "The impact of the feedback did not affect my sight-reading in any way. However, it did make an impact on my memorisation and improvisation." (Session Five)

5.5.2 Developing the use of feedback in learning to a jazz piece

The harmonic structure of the jazz piece made an impact during the first practice session. I began to select individual sounds from my listening (see DVD ex 4).

> "I was very aware of the harmonic structure but found it difficult to be able to remember them aurally." (Session 1)

In practice session 2, the auditory feedback made an impact on memorisation as I started to store some of the melody in my long-term memory during the memorisation task. For the first improvisation session, the auditory feedback from my playing did not have any impact on my learning.

> "I was pleased that the auditory feedback helped my memorisation task. However, there was only minimal influence towards completing my improvisation task." (Session 2)

During practice session 3, the auditory feedback mainly helped towards memorisation as in the previous sessions.

> "I clearly felt the impact of the auditory feedback of bars 1 to 4. It has gone into my long-term memory; I started to think I knew these melody lines well." (Session 3)

As I continued to proceed to practice session four, the impact of the feedback from bars 1 to 4 continued to influence my long-term memory. During practice session five, I continued to support the development of my schemata of the melody line of bars 1 to 4 in my aural memory and developed a more detailed and secure aural schemata.

5.5.3 A Comparison of the use of Feedback in Self-regulated learning to improvise to Classical and Jazz Music Pieces

The first four bars of the classical piece, 'chromatic classical theme' were quickly established in my memory. However, I did not manage to learn the second half of the fourth bar. Additionally, I also learned aurally the melody line from bars 9 to 12 (see Figure 5.12).

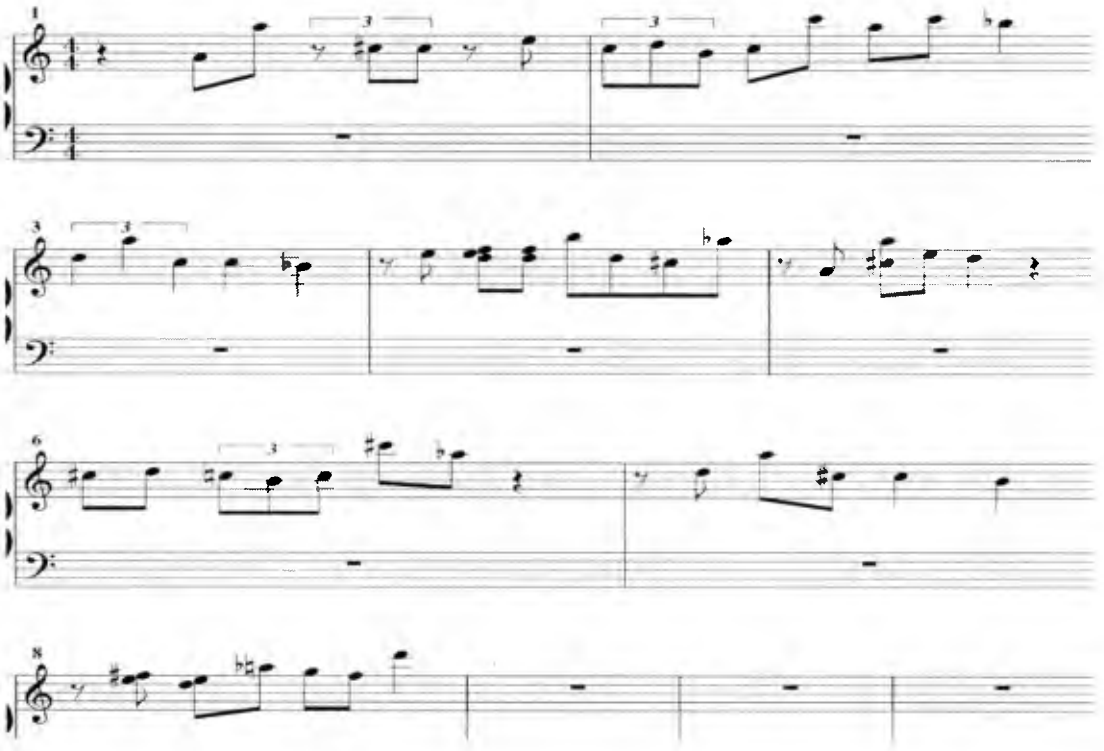

Figure 5.12: The music transcript of practising to develop feedback from bars 9 to 12 in chromatic classical theme

Similarly, the aural schemata I had developed in my self-regulated learning of the jazz music piece, 'chromatic blues', was mostly of the melody line from bars 1 to 4. For example, Figure 5.13 shows the first musical phrase from bars 1 to 4 of my developing schemata. This was the first important phrase from this composition. Having utilised

the feedback from this section, this helped to strength my memory when I tried to memorise.

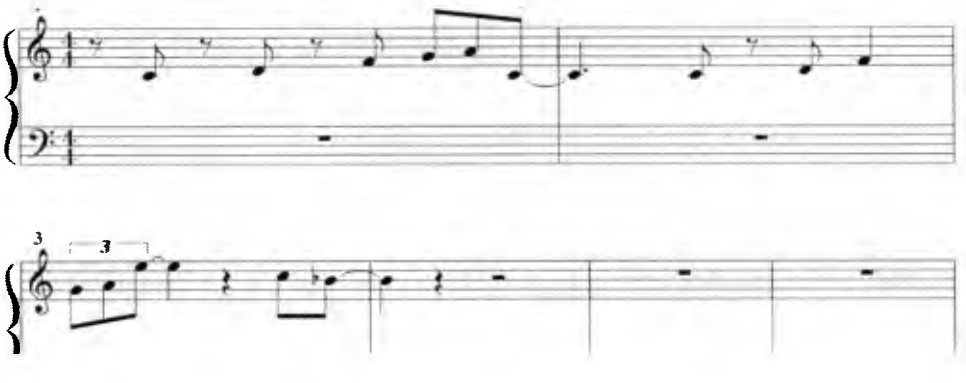

Figure 5.13 the first musical phrase from bars 1-4 of the jazz piece

Overall, the differences in the role of feedback in developing aural schemata relating to the two pieces were very small. For both the classical and jazz music pieces, I was not able to internalise the sound after the first practice session (see DVD ex 5.4.3). After the second session, the knowledge of the music's sound that I had acquired was the same from the first melodic phrase in the music stimuli 'chromatic blues' and 'chromatic classical themes'. There was no impact from the learning during practice session 4 with the classical piece, 'chromatic classical themes.' This was caused by the fact that I relied more on learning from the notation rather than aural learning during this particular session.

5.6 Automaticity

5.6.1 Developing Automaticity in Learning to Improvise to a Classical Music Piece

As I began to practise the classical piece, I initially did not achieve any automaticity; there was a need to do more practice. During practice session two, there was evidence of an improvement in automaticity as my figuring became more fluent.

> "I began to play faster after session two and my fingers were light compared to the previous session." (Session Two)

However, the level of automaticity remained the same after practice sessions three and four and there was not much of an improvement. I still felt the need to be comfortable with the physical adaptation of the piece. Only after the fifth practice session did the level of automaticity increase slightly.

> "I spent more time getting familiar with the piece." (Session Four)

5.6.2 Developing Automaticity in Learning to Improvise to a Jazz Music Piece

When I started to practise the musical stimuli from the jazz style, the level of automaticity was very low. I noted that I improved very slowly after two practice sessions. Only after the third practice session did I begin to see a more obvious improvement. Motor learning skills in relation to physical adaptation was the first set of skills to improve significantly. "The level of automaticity started to increase in motor learning skills." (After the third practice session.)

After the fifth practice session, my motor learning skills improved further, particularly from bars 1 to 4, and similar results were achieved in bars 12 -16

> "Bars 1 to 4 started to become much easier to play and I started to store them in my long-term memory." (After the fifth practice session)

5.6.3 A Comparison of the Development of Automaticity during Learning to Improvise in the Classical and Jazz music Pieces

The composite Figure 5.14 suggests that automaticity first reached a high level from bar 1 to the first beat of bar 9. There was clear skill development and knowledge acquisition. My reading music skill developed as I scanned one bar at a time. The state of physiological adaptation was also at a more efficient level as I played those bars fluently. In addition, auditory memory was established, as I was able to remember aurally the first melody line from bars 1 – 4. Similar development of automaticity occurred throughout the rest of the classical music piece. After bar 1 to the first beat of bar 9, I reached a high level of automaticity, the second section of bars 9 to 16 also developed higher levels of automaticity followed by the last three bars of the composition (see figure 5.14).

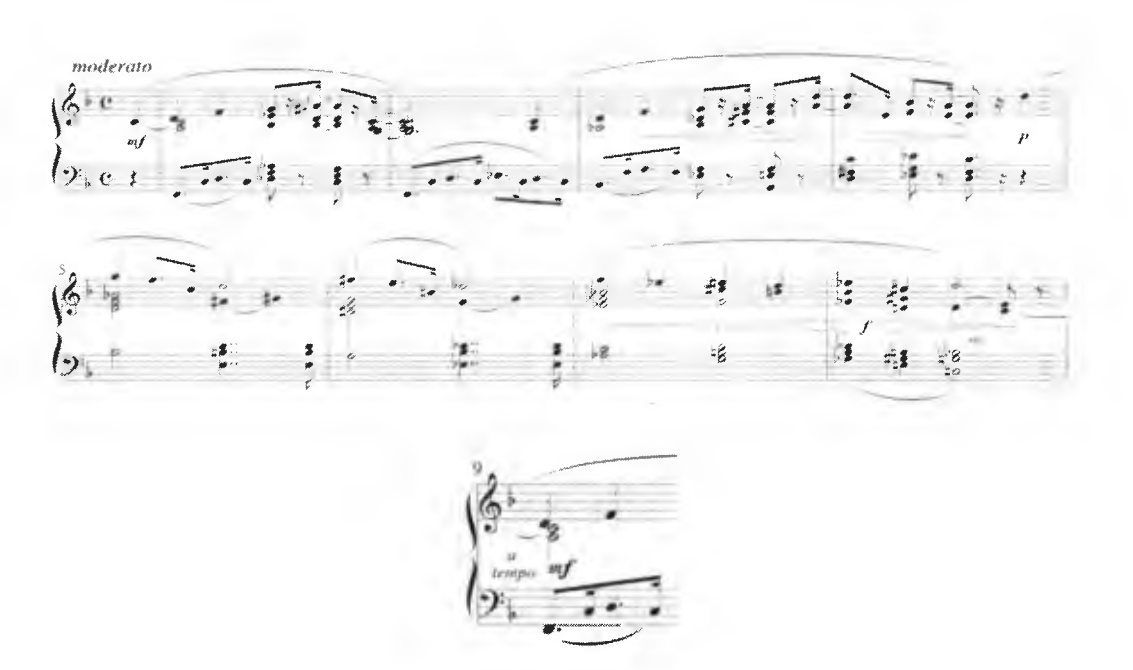

Figure 5.14: Extract from the first section of bars 1 to first beat of bars 9 has reached the level of automaticity

The level of automaticity developed less efficiently in learning the jazz piece. For the classical music piece, the automaticity covered the entire composition. However, for the jazz piece 'chromatic blues', I only acquired automaticity to bar 12 (see figure 5.15). The difficult section from bars 13 to 20 did not reach automaticity in reading music skills, physiological adaptation, nor establishing auditory memory. The unfamiliar style had a negative impact on the development of my automaticity.

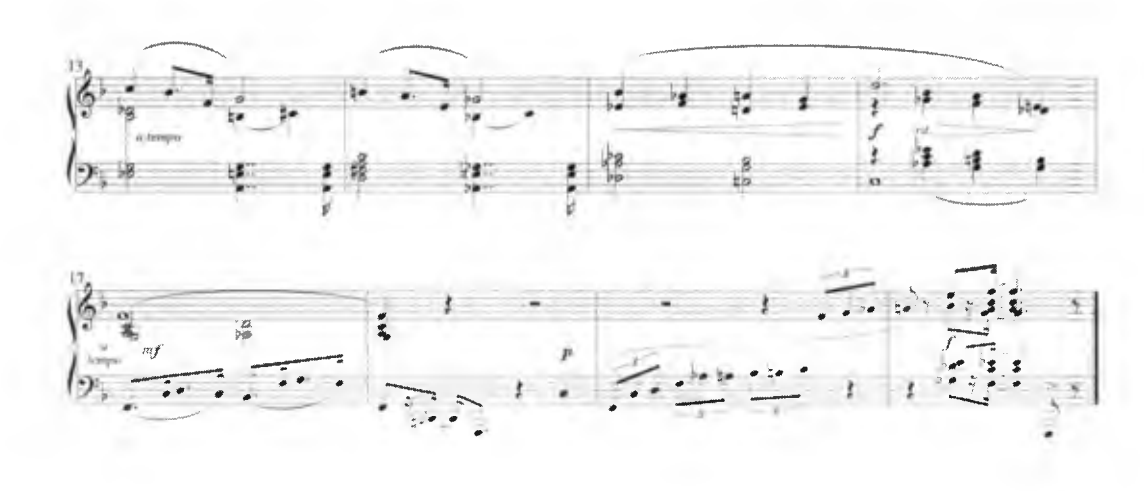

Figure 5.15: The section from bars 13-20 did not reach automaticity in reading music skills, physiological adaptation or establishing auditory memory

The level of automaticity was similar in sessions 1 and 6 as there was no automaticity developed after working on either the classical and jazz style music stimuli. The differences began to show in practice sessions 2 and 7. However, there was still no development of automaticity with the jazz piece, 'chromatic blues. Progress in developing automaticity from practice sessions 3 and 8 was similar as there was no improvement with either the familiar or unfamiliar musical genres. At the end of the fifth practice session, a high level of automaticity had been achieved in playing the classical piece, whereas for the jazz piece, the level of automaticity remained at a low level.

5.7 Musical Memory

5.7.1 Developing Musical Memory for a Classical music piece

After my first practice session on the classical piece, 'Chromatic Classical', I could not remember any of the melody or harmony progression using my aural memory. As I proceeded to the second practice session, my aural memory began to develop and I could remember more. I continued to improve after the third practice session.

> "I felt that my aural memory and kinaesthetic memory started to build up." (Session Three)

There was a continuous activation of aural and kinaesthetic memory after the fourth practice session. After the fifth practice session, there was further improvement on aural and muscle memory; however, there was no improvement in developing aural schemata from looking at the score.

> "I feel that my aural memory and muscle memory has developed gradually but I have found it hard to visualise the sound from reading the score.' (Session Five)

5.7.2 Developing Musical Memory for a Jazz Music piece

There was a gradual improvement in my aural and kinaesthetic memory during all six practice sessions on the jazz stimulus, 'Chromatic Blues'. During the first practice session, there was no evidence of any improvement in music memory function (see DVD clip 3).

> "Aural memory is not progressing. As a result the memorisation task showed no improvement. Motor learning skills were sufficient to rely on." (During the first practice)

During the second session, I concentrated on improving my aural and kinaesthetic memory. Improvement in long-term memory for bars 1 to 4 and bars 17 to 19 was evident as the result of the first memorization task (see figure 5.16).

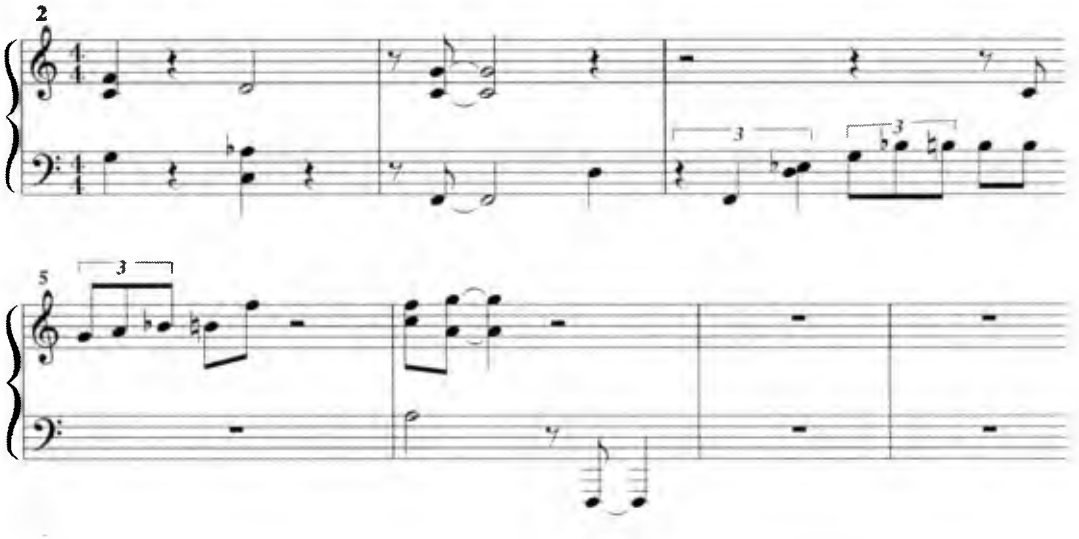

Figure 5.16: The improvement in short-term memory in bars 17-19

There was no sign of long-term memory development during the first hour of practice. In the third hour of practice, evidence of my kinaesthetic memory's improvement was apparent as there was more fluency displayed in my motor learning skills.

> "My kinaesthetic memory is improving as more fluency has been established." (Session 3)

Further improvement of aural memory and kinaesthetic memory was evident as more bars were remembered as a result of the memorization task. Parts of the memorization had developed through an improving aural memory, i.e. top melody line on bars 15 and 16 (see figure 5.17).

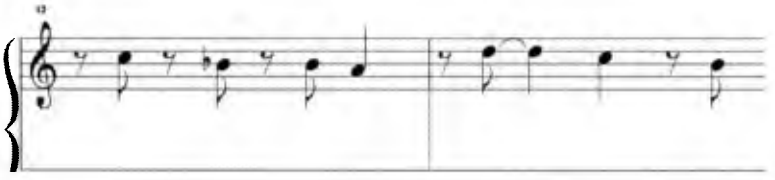

Figure 5.17 Top melody line on bars 15 and 16

Kinaesthetic memory helped to carry the memorization of bars 1 to 4 and bars 17 to 19.

> "my aural memory and kinaesthetic memory were developing side by side." Session 4)

Aural memory improved as demonstrated by my performance of the memorization task, i.e. more melody lines had been remembered (see Figure 5.18); at the same time kinaesthetic memory had progressed.

> "As aural memory developed further, it helped the muscle memory to store more." (Session 5)

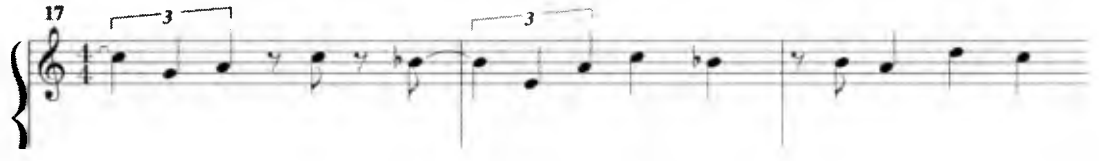

Figure 5.18 the top melody line in bars 12-16

However, for the visual memory it was a very different case. After five practice sessions, there was no improvement in visual memory; it was proving extremely difficult to activate my visual memory.

> "No visual memory has been developing each successive time I have tried to carry out the memorization task, I could not visualize the material at all.' (After five practice sessions)

5.7.3 A Comparison of the Development of Musical Memory in Classical and Jazz Pieces

Aural memory was not established in practice session 1. With the jazz music piece 'chromatic blues', both aural and kinaesthetic memory started to develop slowly during session 1. This development continued throughout most of the practice sessions, which demonstrated that the aural and kinaesthetic memory developed side by side in the jazz

piece 'chromatic blues'. The development of aural and kinaesthetic memory appeared to be separated in learning the 'chromatic classical themes'; for instance, aural memory improved after session 2, but there was no improvement in kinaesthetic memory. By practice session 3, kinaesthetic memory had begun to increase. Overall, the improvement in developing music memory was more consistent for the classical music stimuli 'chromatic classical theme' than with the jazz piece 'chromatic blues'.

5.8 Memorisation Strategies

5.8.1 Memorisation Strategies for memorizing a classical music piece

In the first practice session with the classical music, I started to practice slowly with the right hand for the first four bars melody and then continued to play through until the end of the piece. After I started to learn the entire structure of the composition, I chunked different sections from the piece and concentrated on those particular places.

> "Right hand only practice – slowly from bars one to five; left hand only from bars one to six, slowly." (Session One)

For the second practice session, I concentrated on the beginning of the composition and chunked it into small sections. At the same time, I repeated those sections at least three times.

> 'Practiced both hands from bar one. Each time, i.e., when it came to a spreading chord on the left hand and followed by an ornament. These were repeated three times before I went on to next bar. This procedure continued until bar 6.' (Session Two)

5.8.2 Memorisation Strategies for Memorising a Jazz Music Piece

During the first practice session in learning the jazz piece, I applied two practice strategies for the memorization, 'chunking' and 'playing through'.

> "Chunked bars 1-9 and repeated it six times." (Session 1)

Within the strategy 'playing through', there were further variations in applying this strategy. I scanned the written notation from the beginning to the end very quickly and mentally reduced all notes in each bar to one chord, then I played each chord through from the beginning to the end in a slow tempo.

> "Playing through the whole piece by chords at a very slow speed." (Session 1)

When I practised for the second hour, I concentrated on using only one practice strategy, 'chunking'. The application was implemented in bars 6 to 8 and bars 12 to 16. This procedure was repeated twelve times at a slow tempo.

> "Chunking – bars 6 to 8, 12 to16 and repeated twelve times and practiced those bars only throughout this session." (Session 2)

When I was practicing in the third practice session, I was still experiencing a high level of anxiety and it affected the way I applied my practice strategies. Everything I practiced had a much faster tempo as if I wanted to include as many different practice strategies as I could in order to achieve a better result for my memorization task.

> "Playing through the piece from the beginning to the end for 6 times. Applied slow practice on bars 7 and 8 for 22 times. I suddenly began to play through the whole piece frantically up and down and at the same time worried about not ever being able to remember the piece. Then I went back to bars 7 and 8 and repeated them so many times that I lost count." (Session 3)

The third memorization task did improve as I could remember more than the second task. For instance, I remembered the ending of bars 17 to 19 more effectively. As I regained confidence in my memory ability, I decided to focus on the difficult bars in the fourth practice session. I used the strategies of 'slow practice', 'playing it through' and 'chunking' specifically on bars 6, 7, 8, 12, 13, 14, 15 and 16.

"Played from beginning to end, twice; then chunked bars 12, 13, 14, 15 and 16 in a slow tempo. Second chunking on bars 6, 7 and 8. Then played from the beginning to the end three more times. Then went back to chunking on bars 12 to 16 once and bars 6 to 8 for five times.

(Session 4)

During the fifth practice session, I planned to reinforce my memory of the harmonic structure of the piece; therefore, I applied two strategies to achieve this goal. I played through the base accompaniment from beginning to end once, then reduced the notes from bars 6 to 8 into spreading chords and repeated them many times. This procedure was also repeated in bars 12 to16. Another goal I aimed to achieve was to remember bars 6 to 8 and bars 12 to16. I concentrated all my efforts in the practice strategy application to achieve these two short-term goals.

"Practiced bars 6 to 8 by reducing the notation to spreading chords. Practiced bars 12 to 16 in the same manner as bars 6 to 8. Concentrated mentally to remember these bars 6 to 8 and 12 to 16."

(Session 5)

The agenda of the fifth practice session changed dramatically as it was focused on the long-term goal of improvisation instead of achieving short –term memorization goals. Previously, most of the strategies I had applied since the first practice session were aimed at short and long term goals for my memory of 'Chromatic Blues'. Mentally, I was concerned with the extent of my short - and long- term memory capacity, this was because I believed that if I could improve my short-term memory capacity then it could help with my improvisation. However, my approach in the fifth practice session was very different in terms of practicality. I strategically chose a bass line motif that I thought I could use for the improvisation task and concentrated on remembering this particular feature. I had not practised this feature specifically during the previous five practice sessions.

"Practised the repeat on the left hand of the first three bars, to get the feel of the 'groove'. I believed I could secure this motif. It could help me to improvise over longer period of time." (Session 5)

Another strategy that I used in the sixth practice session was not to look at my left hand while I was playing through the melody. Additionally, I tried to play through without reading the written score. These two strategies were also new and had not been applied in the previous practice sessions; they were designed for memorization.

"I tried not to look at the left hand while playing through the melody. In addition, I tried to play through without reading the score."
(Session 5)

5.8.3 A Comparison of the Memorisation Strategies for Memorising Classical and Jazz Music Pieces

I felt that the ornamentation from the classical piece was a more difficult musical feature to memorise than the other features, as shown in Figure 5.19. I applied strategies such as 'slow practice', 'repeating' and 'chunking' to help with this issue.

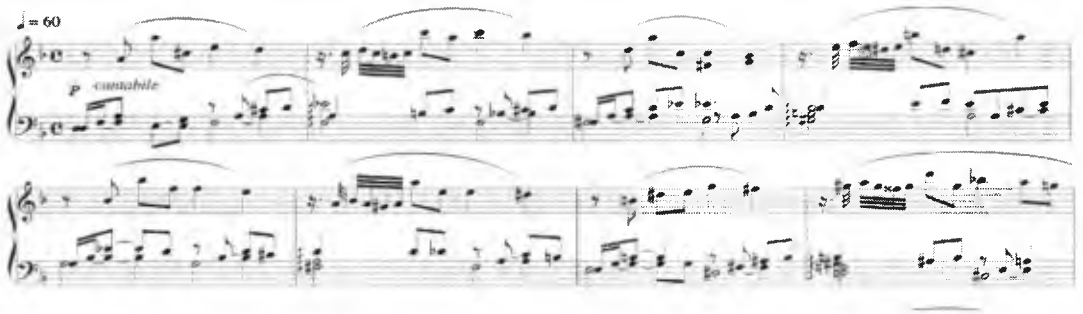

Figure 5.19: The difficult ornamentation in developing memorisation in the beginning section of the classical piece

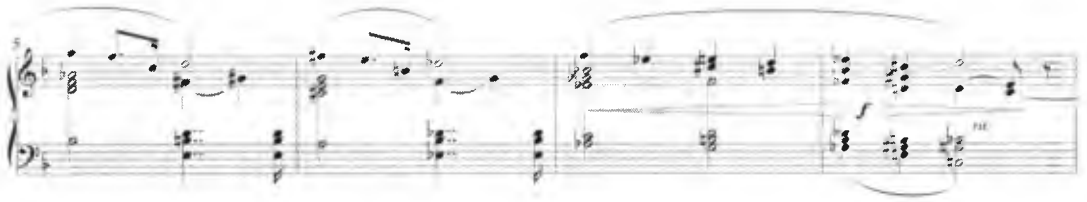

Figure 5.20: The difficult bars 7 and 8 in developing memorisation strategy from memorising 'chromatic classical themes'

Bars 7 and 8 were difficult musical features in the jazz music piece 'chromatic blues' (see figure 5.20); this might have been caused by the fact that the chromaticism in bars 7 and 8 was a challenging the memorising task.

The memorization strategy that I applied for memorizing the classical piece included slow practice, chunking, playing through, repeating, separate hand practice and spreading chords practice. Strategies such as slow practice, chunking and playing through were long-term goal oriented, whereas repetition, separate hand practice and spreading chords practice were for short-term targets. On average, I used three types of memorisation strategies in each practice session. For the jazz music piece 'chromatic blues', more than three types of memorisation strategies were used in four out of a total of five practice sessions. The strategies were: slow separated hand practice, play through, right hand only practice, both hands in slow tempo, left hand only in slow tempo, left hand only practice, repeating, chunking, ornament practice and without notation practice. I applied more strategies for the memorisation task of the jazz piece. This was due to the fact that there were more difficulties encountered in memorising it.

5.9 Analytic Strategies

5.9.1 Developing Analytic Strategies in self-regulated Learning to Improvise to a Classical Piece

I began to work on the harmonic structure in my first practice of the classical piece. I studied the harmony progression carefully. "I analyzed the structure of the piece while scanning the notation." (Session One.) However, I was not able to apply any analytic strategies during the second practice session as I spent most of the time learning the music. After the third practice session, I managed to analyze from the harmonic structure more deeply.

> "I recognized the harmonic structure from bars 10 to 16 were more complex than at the beginning of the piece." (Session Three)

As I practiced for the fourth time, I began to grasp the piece by understanding the entire harmonic progression.

> "I feel that I have developed deeper understanding of the piece from its harmonic structure." (Session Four)

5.9.2 Developing Analytic Strategies in Self-regulated Learning to Improvise to a Jazz Piece

During the first session of learning to improvise with the jazz stimuli, I recognized that (for me) the importance of knowing the harmonic structure and I wanted to achieve familiarity with all the harmonic changes. I also recognized that I had very little experience in jazz/blues harmony and it would be much more difficult for me to learn it. The only useful strategy that I had was to play the piece for as many times as I could. "Whatever the physical practices I wanted to get the unfamiliar harmony into my head." (Session 1.)

However, as I continued to practice, I was more focused on the memorization goal and related skill development. I did not apply any analytic strategy. For instance, when

implementing a specific strategy to learn the unfamiliar harmony I began to recognize that I had a weakness in developing analytic strategies. When I practiced for the fifth time, I used my newly learned knowledge of the harmonic structure and tried to apply some of the harmony in my improvisation task.

> "Achieving a coherent improvisation and implementing harmonic structure from the stimulus." (Session 5)

5.9.3 A Comparison of the Application of Analytic Strategies in self-regulated learning to improvise to Classical and Jazz Music Pieces

I had a clear idea of applying analytic strategies when I was learning to improvise with the classical music piece. In session 1, I analyzed the harmonic structure of the composition while I scanned the notation. I established a deeper understanding of the musical structure of the piece after session 3 in order to use this information to complete the memorization and improvisation tasks. From that, I recognised the chromatic harmonic progression (see Figure 5.21) from bars 10 to 16 and spent more practice time on this particular section. However, it was extremely challenging to implement such an analytic strategy with the jazz piece 'chromatic blues'.

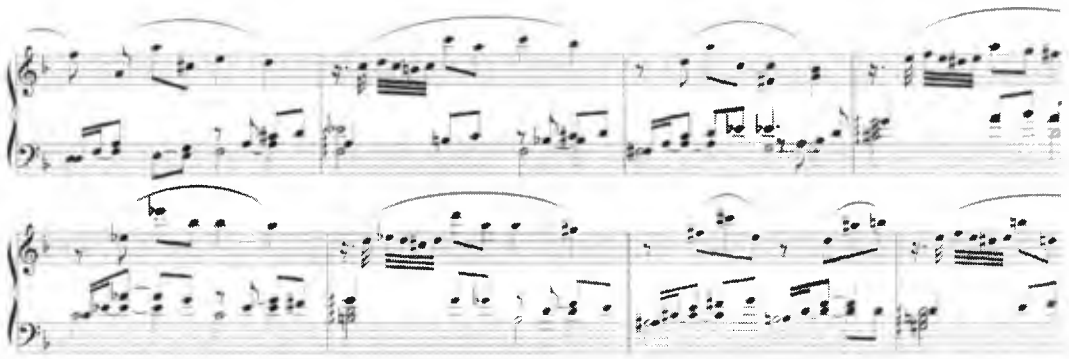

Figure 5.21: Analytic Strategy approach in 'Chromatic Classical Themes'

I tried to analyze the harmonic structure of the composition. This process took much longer with the 'chromatic blues'. The speed in developing an efficient analytic strategy was faster and more consistent with the classical music stimuli 'chromatic classical themes'. Not until practice session 10, did the effect of the analytic strategy start to make an impact on improvising. This was likely due to the fact that I had very little prior knowledge of jazz music.

5.10 Solo Improvisation Strategies

5.10.1 A Novice Developing Improvisation Strategies in Self-regulated Learning to Improvise to a Classical Music Piece

The strategy that I applied for my improvisation after the first and second practice sessions using the classical piece relied on memory. I gave no consideration to improvisation practice strategies in the first self-improvisation task. My emotional level was unstable and I was experiencing a high level of anxiety, which prevented me thinking about using effective strategies.

> "I am extremely worried about improvising. I cannot think clearly."
> (Session One)

From session 4, I was able to apply an analytic strategy for completing my improvisation task. I used the learned knowledge of the existing harmonic structure to invent a range of motifs so that I could utilize these musical features during the improvisation process. At the end of session five, I relied on my short and long-term memory as my improvisation strategy.

5.10.2 Developing Improvisation Strategies in Self-regulated Learning to Improvise to a Jazz Music Piece

I experienced a high level of anxiety during self-regulated learning to improvise on the jazz music piece 'chromatic blues' during the first practice session. This emotional outcome negatively affected my thinking as well as my physiological adaption.

> "My mind was blank and my hand was shaking. I felt physically sick when I placed my hand on the keyboard." (Session 1)

This continued throughout the second practice session and no improvisation strategy was used during practising. After the third practice session, I relied mainly on memory as my improvisation strategy.

> "I think that if I can remember something from the music piece, I can use that for the improvisation task." (Session 3, DVD ex 6))

5.10.3 A Comparison of the improvisation strategies adopted for classical and jazz music pieces

Comparing my improvisation strategies for both classical and jazz music, I was more able to use a wider range of improvisation related strategies with the classical music piece. I managed to utilize a memorization strategy and an analytic strategy during my self-regulated learning to improvise. The memorization strategy helped me to build a stronger long-term memory of the piece across the practice sessions which was essential for completing the improvisation task. The analytic strategy was useful in utilizing the harmonic structure as a reference point when improvising. By contrast, in relation to improvising the jazz piece, I struggled when applying effective improvisation strategies. In particular, I was affected negatively by my high level of anxiety at the beginning of session 1. In addition, it took a much longer time to reduce the level of anxiety that had been experiencing during practising. Eventually, I was able to rely on my memory as my improvisation strategy.

5.11 Analysis of Semi-Structured interview Data of the Expert Improvisers

Method of Analysis

In this section I analyse data from the semi-structured interviews with the expert classical and jazz improvisers. The interview data were analysed using the process of iteration which was devised by Cooper and McIntyre (1993). This process mirrors that used with the data of the novice improviser from a classical background.

Emerging themes and Subcategories

Two themes emerged from the data. Within each theme, there were subcategories. Theme 1, skill development and knowledge acquisition in learning to improvise, included 3 subcategories. They were the role of sight-reading skills in improvisation, the development of automaticity in long-term working memory, and errors and difficulties in developing memory skill in relation to improvisation. In Theme 2, practice strategies were also divided into 5 subcategories. They were the function of solo improvisation in classical and jazz music tradition, the role of the harmony, working with harmonic rules, using musical structure to develop coherent improvisation and adopting a composing approach.

5.11.1 The Role of Sight-reading Skills in Improvisation

There seemed to be a significant connection between sight-reading and improvising for some of the classical musicians. For the organists, sight-reading skill was one of the essential requirements in professional qualification such as fellowship exams and it needs to be at quite a high level.

> "In the fellowship exam, a series of keyboard skills are examined. One of them is the ability to play a piece from sight, usually quite a complex piece."
> (Ken, classical organist)

An experienced improviser, Peter, discovered that he had good sight-reading skills as a teenager and used sight-reading and improvising to avoid deliberate practice.

> "I remember a piano teacher would gave me a piece to practice. By the next week, not really have practiced them, I would improvise on them and then she would say oh that was very good you have done a lot of work on that. Then I had not but I got away with it. I got away from relying on my sight-reading other than that I was really knowing and learning the piece so I am a complete charlatan and a cheat!"
> (Peter, classical organist)

There would seem, then, for some musicians to be a role for improvisation when playing from notation.

5.11.2 The Role of memory

Expert improvisers from both classical and jazz musical backgrounds recognized the importance of the role of memory in relationship to learning to improvise. Furthermore, expert improvisers believed that there were different types of memory. Some aspects of memory they were more aware of than others.

> 'There is a memory bank of course. Sometimes it is more conscious than others.' (Ken – classical organist)

Professional improvisers from classical and jazz backgrounds described the necessity to be able to access to their memory automatically, which enabled them to apply musical knowledge and resources in a short space of time. For example, a classical organist described how the process of how their aural and motor-sensory memories become automated when improvising.

> "It's like I got into the lift, I know an exit is on the sixth floor but I don't consciously think about it. You just automatically press floor six. There is something that is operated in an automatic way. I know that pattern; my figures

will go into that pattern and knows what it's going to sound like. It's like driving a car." (John – classical organist)

The difficulty which expert improvisers encountered in the memorisation task performance was to memorise from notation. When memorisation from notations was less important, the skills were less well developed.

> "In the organists' tradition, the emphasis is more on sight-reading because of the number of times you have to accompany choirs, it is more important to develop sight-reading skills than memory skills. As a consequence I have very little memory skills. Even for a piece I know terribly well, I probably will not play from memory." (Dave, classical organist)

5.11.3 Solo Improvisation Strategies

The Function of Solo Improvisation in classical and Jazz music tradition

Solo improvisation has been described as one of the more complex art forms due to its context. In jazz, it has been considered as a high level creative process as well as an essential learning process. Most jazz improvisers work in groups when performing improvisation and they usually are responsible for one musical part of the improvisation. As such, it is more challenging to improvise individually as one need to develop more than one line of a musical phrase in real time. Additionally, jazz musicians believed the process of solo improvisation was important to musical learning and can broaden the knowledge of musical language.

> "Solo improvisation is pretty much the hardest thing to do. It gets so much involved and so exposed. Just playing piano on your own, to make everything interesting is very hard to do. The possibilities are so slim as well…there is harmony you have to consider as well. However it helps when you play in a group, develop the language thing." (Gwliym, jazz pianist, DVD ex 5)

In classical music, solo improvisation has been seen as an essential ability to acquire. For instance, solo improvisation has been included in professional organ musicianship

examinations such as the fellowship. The function of solo improvisation for the classical organist is an essential part of a professional service to the church communities and society at large.

> "You have a solo improvisation test – you are given a motif, a short motif, a short fragment of a tune which you improvise on that for 3 or 4 minutes. So in many ways, that sort of reflected on what organists do. That's very often in the context of church service in this country." (Karen, classical organist)

Hence, the expert classical improviser does not see solo improvisation as a difficult skill to acquire. It is considered an essential professional service in the church tradition and caters for the need of the community attending such services. Solo improvisation is part of the musical craft amongst classical organists.

> "It's quite likely that in the church tradition that something happen in the service, you either play a little piece that was either like what Bach did, a short piece of prelude or choral , and all the organists will improvise. This piece would be too short. You either extend the melody. You sing a Hymn little bit longer. Sometimes the service need so organists by tradition will provide. That was part of their skill or craft if you like. So it was not a strenuous thing to do." (Ken, classical organist)

The role of harmony

The strategies that a professional expert improviser adopts are largely a matter of personal choice. One classical improviser described his preference to use harmony in his improvisation. This was due to that fact he has been trained in this way. At the same time, he enjoyed using harmony as his solo improvisation strategy.

> "I tend to improvise – playing chords. I suppose that being an organist myself, I am harmonically driven. So I love harmonies and playing around with harmonies. And that again was an improvisatory thing that being a keyboard

player, harmony drives you, the richness of the chord colour." (John, classical organist)

Working with the harmonic rules was also an effective strategy for solo improvisation in jazz. Expert improvisers acquire an in depth of knowledge of harmonic rules and improvise around the rules. For instance, creating a melodic improvisation based from the given chords.

> "It's all based on the chord. From these chords, there is always a kind of melodic improvisation going on where you do things like I – II-III- V or V-II-III-I. And you start to go through the chord changes. You kind of develop this kind of efficiency to get around. You are not playing any notes out of these keys. You kind of get the feeling like you are going through maze, to certain degree. You are hitting all the right notes, at the right places." (Nick, jazz trumpeter)

> "It's like you got used to changes – like II-V-I progression, and all that stuff, and it is a matter of doing an efficient job. You kind of have to know all the different opinions, and it's all quite formulated in a way." (Tom, jazz trombonist)

Using Musical Structure to Develop Coherent improvisation

Developing a coherent solo improvisation is essential to professional improvisers. Musical structure has been used to produce coherent solo improvisation. In classical music, the musical structures are formed from classical compositions. For instance, ABA form was commonly used.

> "When I was doing my fellowship exam, my teacher, an organist in Canterbury Cathedral, he actually gives my clues on improvising. A form which you use and it is simply based on the keys you are using or the forms, like ABA form, rather than based on some chords which sound nice, you then develop improvisation

on that. He actually taught me to develop improvisation by making up a piece so it became more coherent if you like. It was very useful to me." (Ken, classical organist)

Highly structured musical forms are also used in jazz. Expert improvisers develop melodic phrases within the given structures and forms also working around specific harmonic rules.

> "When you are improvising with the jazz harmony that you don't just play; you have a form of structures you operate. You know if you are improvising on the 12 bars blues on that, you have 12 bars blues which is very highly structured form. And within that you started by using blues notes, sliding from note to note." (Rob, jazz clarinettist)

Using a composing approach

Expert improvisers from classical and jazz genres perceive the process of improvisation as similar that of composing. Professional improvisers even identified themselves as composers. Consequently, the strategy of using compositional approach was derived from that.

> "I think I am a closed composer. I should be a composer really. Someone said improvisation is the start of composing so you move into composing. But I never made that leap. Sometimes I think would it be nice if I have written that down, or notated that. That would be fabulous you know. But I never do." (Peter, classical organist)

James was active in both processes - composing and improvising. He applied the composing approach when improvising such as transcribing his improvisation to written notations.

"When I compose, I used to do it on a computer. I just write what I heard in my head straight onto paper. And now I tend to write improvising thing, the little things I like and I will write them down." (James, jazz bass clarinettist)

5.12 Summary

The self case study of a naïve improviser demonstrated that improvising is a complex musical activity that requires a combination of multi-level skill development and knowledge acquisition. During the self-regulated learning to improvise on the two classical and jazz style pieces, there were six stages evidenced in my learning processes as I acquired musical skills and domain knowledge. These were:

- In Stage (1): I practised to develop physiological adaption and knowledge of the music.
- Stage (2): I became efficient at reading the music and established meaningful auditory schemata.
- Stage (3): My skills and domain knowledge acquisition reached the level of automaticity.
- Stage (4): I started to improvise using a memorisation strategy.
- Stage (5): I began to improvise using an analytic strategy.
- Stage (6): I was able to improvise around a musical structure.

More difficulties were encountered during learning to improvise on the jazz piece 'chromatic blues' in terms of physiological adaptation, developing reading music skills, establishing aural schemata and reaching a high level of automaticity. This was due to the fact that I had very little prior knowledge of jazz and very limited experience and skills relating to this particular musical genre. The process adversely affected my existing skills and meant that I could only apply them at a much more basic level. This suggests that musical skills and domain knowledge acquisition are not easily transferrable between different musical genres. Memorisation related skills and musical memory were essential to learning to improvise in relation to both classical and jazz

music pieces. As the data have shown, at the more basic level of developing skills and domain knowledge acquisition, the capacity of memory was significant for completing the improvisation tasks.

Analysis of the semi-structured interview data showed that the expert classical improvisers had acquired high levels of ability in developing reading music and considered this as essential skill development in relation to improvisation. The expert improvisers devoted systematic learning to develop high level of automaticity in long-term working memory so that they could draw on existing knowledge in improvisation. Memory was used to enhance relevant domain knowledge acquisition. The expert improvisers utilised extensive domain knowledge acquisition to develop effective solo improvisation strategies. They considered improvisation in an individual context at a high level of creativity and adopted sophisticated strategies such as adopting composing approaches in individual improvisation performance. There seemed to be the difference in the ideology between the classical and jazz expert improviser in relation to the function of solo improvisation performance. The classical improviser seemed to see the role of solo improvisation performance as a fundamental requirement of a professional service, whilst the jazz improviser commented the solo improvisation as the hardest art form to achieve.

There were differences in relation to learning to improvise individually amongst the novice and expert improvisers. The novice improviser experienced difficulty in developing musical skills due to the low level of relevant domain knowledge acquisition. For instance, the level of reading music skills has been reduced to more basic level, while the expert improvisers possessed high level of ability in developing such skills. In terms of developing automaticity in learning process to improvise individually, the novice improviser seemed to focus on the skill development, while the expert improvisers concentrated on the development of domain knowledge acquisition as it aimed to reach the level of automaticity in long-term musical memory. This enabled maximum accessibility to process relevant domain knowledge in real time creativity

such as individual improvisation performance. Furthermore, the novice improviser experienced difficulties in developing effective strategies to enhance the capacity of long-term and short-term working memory whereas the expert improvisers seemed to only have a disadvantage in developing memory skills to maintain the capacity of short-term working memory. In addition, the novice improviser (myself) processed at a low level of ability in developing effective analytic strategies to the limited musical knowledge in jazz genre, while the expert improvisers had acquired a high level of ability in using domain knowledge. Conversely, the novice improviser relied on musical memory in developing a basic form of individual improvisation performance, whereas the expert improvisers were able to apply extensive domain knowledge and adopted composing approaches in its improvisation performance.

From the data derided from the self-case study, I as a novice improviser who has expertise in classical piano performance, has applied limited solo improvisation strategies due to the lacking of relevant domain knowledge when learning to improvise in jazz musical genre. The nature of the solo improvisation strategy from using jazz style stimuli was essentially memory orientation. In terms of transferability of existing musical skills between different musical genres in relation to the improvisation learning process, memory skills were the only type of skills that have been applied in both classical and jazz genre. This was due to the fact that the high level of my existing memory skills from the training of being a classical pianist that was able to survived and used in this challenging task of improvising in an unfamiliar genre such as jazz.

The limitation of domain knowledge acquisition could significantly reduce the level of existing musical skills, such as required for physiological adaptation, reading music skills and the ability to deal with high levels of performance anxiety. The role of memory was found to be important in the development of both novice and expert improvisers' musical skills and strategies in relation to learning to improvise individually as it is used to store relevant domain knowledge. Consequently, the development of memory skill seemed not to be effected by the expertise of different musical genre. It could survive

on its own with the aid of domain knowledge acquisition. In addition, the effect of expertise in different musical genre could cause high level of performance anxiety and conversely influence the improvisation learning process.

CHAPTER SIX:

LEARNING TO IMPROVISE AS A DUO

6.1 The Experimental Study

This chapter is concerned with the data analysis from the experiment in studying sight-reading, memorising and improvising as a duo. This experiment involved two experienced classically trained and two jazz trained musicians who participated in the following tasks (see Table 6.1): (1) performing a sight-reading task; (2) performing a memorizing task; (3) improvising individually, (4) free improvising in a small group context; using two notated pieces of music, one jazz and one in the Western classical genre. Additionally, the chapter includes analysis from the semi-structured interviews with novice and expert improvisers from classical and jazz music background in relation to learning to improvise as a duo.

Table 6. 1 Elements in the experiment

Elements of the Experiment	Description of the Experiment
Element 1	Small group practice in reading the music piece, followed by performance of the piece
Element 2	Small group practice to memorise, followed by memorisation task performance
Elements 3 and 4	Improvising individually and Free duo improvisation

6.1.1 Method of Analysis in the experimental study

The methods of analysis included: (1) the amount of time spent in small group practice in sight-reading, memorizing and improvising; and (2) the accuracy of memorization performance for each participant. From the samples of video data, the researcher noted the total amount of time each participant spent on their small group practice prior to the performance of the two music pieces. Following from the procedure, the researcher calculated the number of errors each participant made during the sight-reading and memorization performance. This was an attempt to compare the skills and performance experiences of novice and expert improvisers from classical and jazz backgrounds.

6.1.2 The Amount of Time spent in Small Group practice in Sight-reading, Memorising and Improvising

The Jazz Piece

Figure 6.1[2] shows that the musicians spent the longest time on small group practice in relation to memorizing. In particular, the jazz pianist and classical violinist duo practiced for 312 seconds before performing the jazz piece from memory. The jazz trumpeter and classical flautist duo spent 108 and 89 seconds in preparing for

[2] The figures present descriptive statistics. No inferential statistical analysis was undertaken as the actual numbers of participants, events and activities were small.

memorization performance, suggesting that the duo had more difficulty in memorizing. The results of small group practice in sight-reading were almost identical amongst all the participants. The musicians spent 35 seconds in preparing for sight-reading performances, indicating that the musicians found sight-reading of the jazz piece a relatively simple goal to achieve. Furthermore, it suggests that the technical level of the jazz piece was below the musicians' abilities. In terms of the small group practice in improvising, the pianist and violinist duo spent much less time than the trumpeter and flautist duo. From the overall results of small group practice in sight-reading, memorizing and sight-reading, there was no direct connection between these three activities (see DVD clip 7).

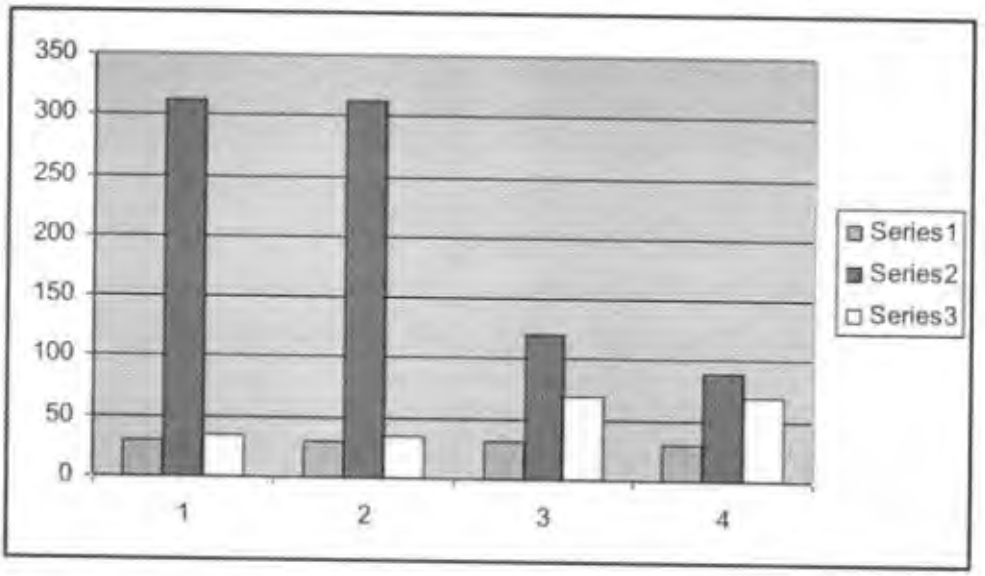

Figure 6.1: Time spent rehearsing memorising, sight-reading and improvisation of the jazz piece in seconds ((Series 1=Sight-reading, Series 2 =Memorizing, Series 3 = Duo Improvising; 1= the jazz pianist, 2=the classical violinist, 3=the jazz trumpeter, 4=the classical flautist)

The Classical Piece

Figure 6.2 indicates that the jazz pianist and classical violinist duo spent twice as much time compared to the trumpeter and flautist duo in small group practice for memorizing. In contrast, the results demonstrate that the pianist and violinist duo spent much less time on group improvising than the trumpeter and flautist duo. This indicates that the trumpeter and flautist duo may have experienced more difficulty in duo improvising. Alternatively they may have had higher standards in producing the duo improvisation performance. All the musicians spent a similar amount of time on preparation for sight-reading. However, comparing the time spent on sight-reading, memorizing and improvising, the results show that fewer difficulties was encountered in sight-reading. Furthermore, these results show that there was no direct connection between sight-reading, memorizing and improvising.

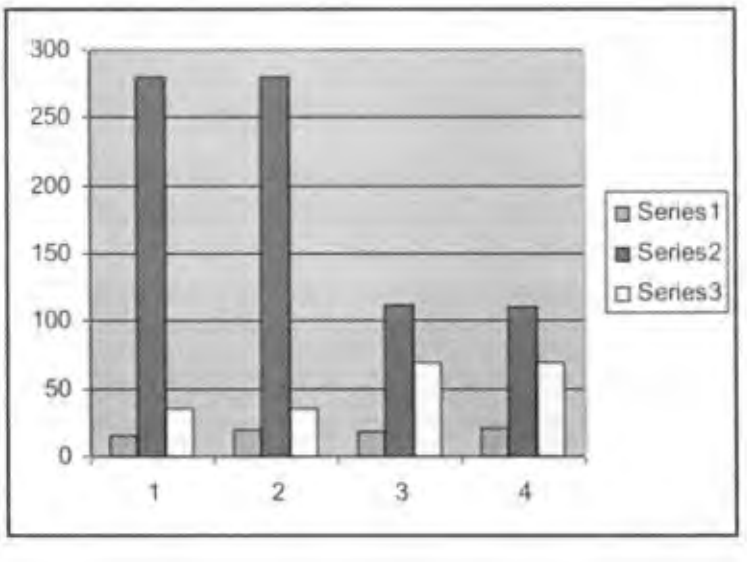

Figure 6.2: Time spent on rehearsing reading, memorising and improvising of the classical piece in seconds (Series 1 = Sight-reading, Series 2 = Memorizing, Series 3 = Duo Improvising; 1= the jazz pianist, 2=the classical violinist, 3=the jazz trumpeter, 4=the classical flautist)

Comparison of the Jazz and Classical Pieces

Comparing the results of the jazz and classical pieces, the jazz pianist and classical violinist duo spent less time on small group practice for memorizing when using the classical piece, whereas the jazz trumpeter and classical flautist duo spent an almost identical time on memorizing for both pieces. There was no clear difference in the results for sight-reading and improvising between the classical and jazz pieces. Hence, the effect of different musical genre did not make a significant impact on the amount of time spent on small group practice with these participants.

6.1.3 The Accuracy in Memorisation Performance

Accuracy in memorisation performance was measured by how many mistakes were made during the performance. There was a timing restriction imposed upon the memorisation performance.

The Jazz Piece

Figure 6.3 shows that the jazz pianist and classical violinist duo performed at a lower level in terms of accuracy in memorization compared to the jazz trumpeter and classical flautist duo.

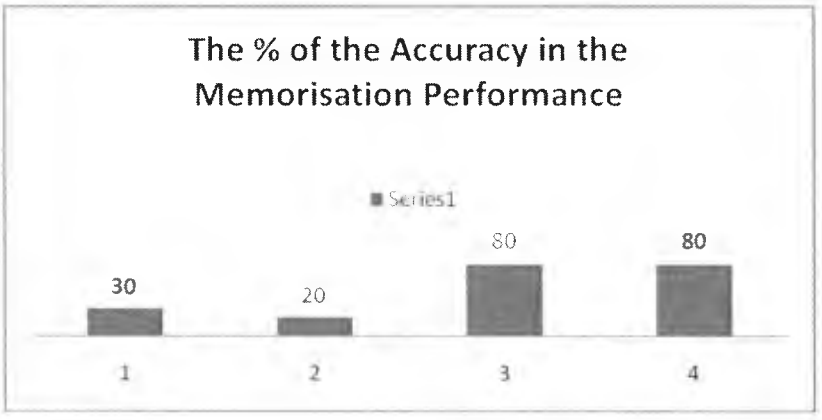

Figure 6.3: Memorisation performance of the jazz piece (1= the jazz pianist, 2=the classical violinist, 3=the jazz trumpeter, 4=the classical flautist)

This suggests that the jazz pianist and classical violinist duo had a lower skill in memorization despite spending a longer time on the task. Within this duo group, the violinist scored lower than the pianist. This might have been caused by a number of factors, such as the effect of small group practice and performance anxiety For instance, practicing together as a duo tended to have a negative effect on the classical violinist. The results show that amongst the jazz trumpeter and classical flautist duo, the level of accuracy was identical.

The Classical Piece

Figure 6.4 demonstrates that the jazz trumpeter and classical flautist performed with 100% accuracy in their memorization performance. By contrast, the jazz pianist scored 60% and the classical violinist achieved 70% and had more difficulties in achieving high accuracy in memorization performance. However, the classical violinist scored higher than his duo partner in relation to memorization performance of the classical piece.

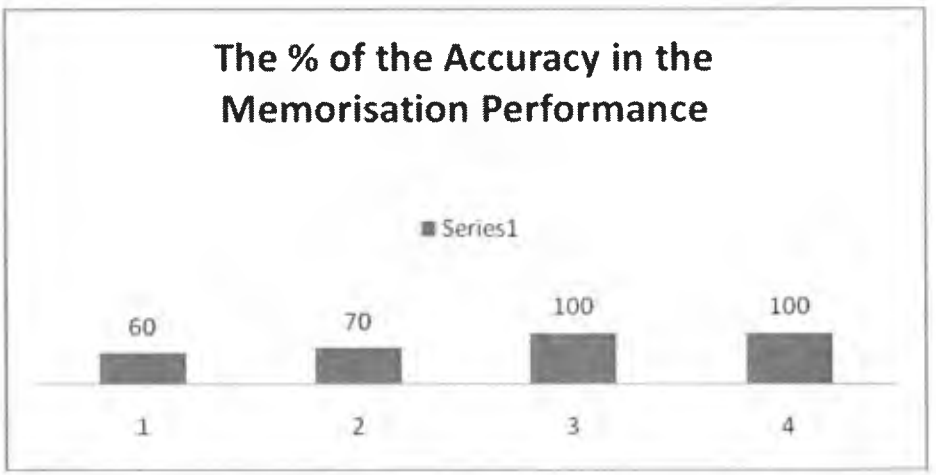

Figure 6.4: The percentage of the accuracy in the memorisation performance of the classical piece (1= the jazz pianist, 2=the classical violinist, 3=the jazz trumpeter, 4=the classical flautist)

The Comparison of the jazz and classical piece

In comparing the accuracy of the memorization performance between the classical and jazz musical genres, the participants overall performed at a much higher level with the classical music piece. For example, the jazz pianist had scored 60% accuracy and the classical violinist scored 70% which was much higher than the 30% and 20% in the jazz piece. Similarly, both the jazz trumpeter and the classical flautist performed at 100%, which was much higher than the score in the classical piece. The effect of musical genre seemed to have impact on the accuracy of the memorization performance.

6.1.4 The Sight-reading Performance

The accuracy in sight-reading performance was measured by how many mistakes were made during the performance. There was no timing restriction imposed upon the completion of the sight-reading performance.

The Jazz Piece

From the results of the accuracy in sight-reading performance shown in Figure 6.5, there was an identical 100 % score from all the participants.

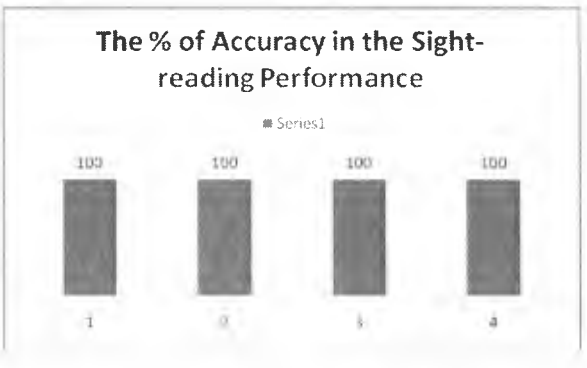

Figure 6.5: the percentage of the accuracy in the sight-reading performance of the Jazz piece (1= the jazz pianist, 2=the classical violinist, 3=the jazz trumpeter, 4=the classical flautist)

This indicates that the level of skills related to completing a sight-reading performance was the same amongst the musicians. The effect of musical genre did not have a significant impact on the accuracy of the sight-reading performance.

The Classical Piece

Figure 6.6 demonstrates that all the musicians scored a similar level of accuracy in the sight-reading performance of the classical piece, i.e., within 3% of each other (the jazz trumpeter had the lowest level of the accuracy with 97%). Both the jazz pianist and the classical flautist had the highest possible score of 100%. This suggests that the classical piece was very accessible for all participants.

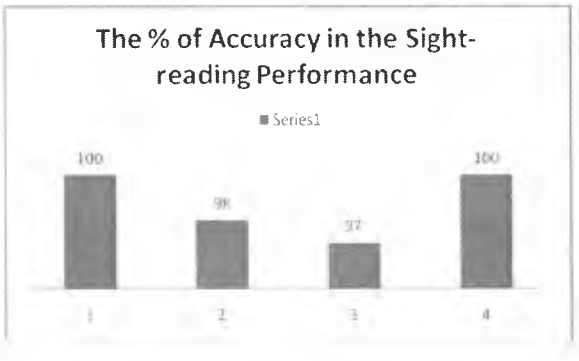

Figure 6.6: Accuracy of sight-reading for the Classical piece (1= the jazz pianist, 2=the classical violinist, 3=the jazz trumpeter, 4=the classical flautist)

Comparison of the Jazz and Classical Pieces

When comparing figures 6.5 and 6.6 concerning the results of the level of accuracy in sight-reading for participants between jazz and classical music, we can see the results were very similar. This indicates that, for these two pieces, the underlying musical genres had no observable significant impact on the level of accuracy in sight-reading performance, at least at this level of difficulty. This was important to know in advance of asking them to improvise on the material.

6.1.5 Individual differences in the memorisation and sight-reading performance tasks

The results indicated that the classical flautist had the highest percentage of accuracy in both the sight-reading and memorization performances (see figure 6.7). With regards to the effect of different musical genres, performance was weakest for memorisation of the jazz piece for the classical flautist.

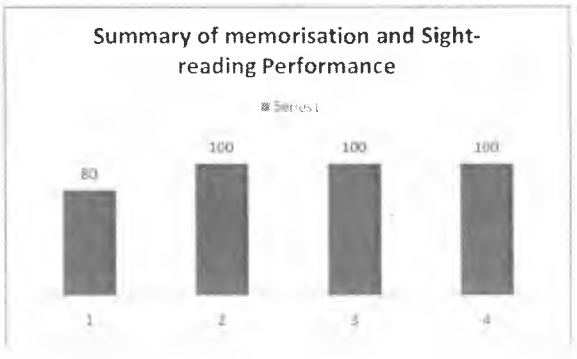

Figure 6.7: The classical flautist's overall score (1=memorizing in jazz, 2=memorizing in classical, 3=sight-reading in jazz, 4=sight-reading in classical)

Similarly, Figure 6.8 indicates that the classical violinist's memorisation performance of the classical piece had a much higher level of accuracy than the jazz piece.

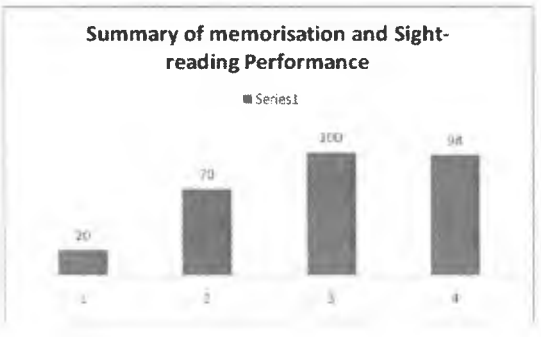

Figure 6.8: The classical violinist's overall score (1=memorizing in jazz, 2=memorizing in classical, 3=sight-reading in jazz, 4=sight-reading in classical)

6.2 Analysis Process for the Video and Interview Data

For the semi-structured interviews with 10 novice and 10 expert improvisers from classical and jazz musical backgrounds, twenty samples of interviews were audio recorded. Each lasted between 25 to 55 minutes. However, as most of the expert musicians were not able to articulate their thinking processes clearly in answering the interview questions, few examples were available for analysis. In particular, the expert musicians experienced difficulty in explaining complex psychological processes involved in improvisation. This also applied to the novice improvisers, as it was difficult for them to explain with limited related performance experiences.

Eighteen video samples were collected in the experimental study. Each sample lasted between 15 to 35 minutes. Analysis was undertaken of significant changes that had taken place during the practice sessions, as well as the length of time each participant had spent on task performance. In the process of analyzing the video data, the researcher chose the analytical method of iterative refinement cycles that was used by Lesh and Lehre (2000). Firstly, the researcher began the first stage of analysis by watching all the footage. The researcher then applied analytical criteria such as expertise theory and the framework of Cunha and colleagues (2002:119-120) – see literature review – to examine possible significant factors involved in the small group work, such as leadership, member characteristics, information flow, memory related factors, organisational configuration and resource to all the collected video samples.

Both the video and interview data were analysed using a process of iteration devised by Cooper and McLntyre (1993) to identify emerging themes (see methodology chapter and also chapter 5).

6.2.1 Emerging Themes and Subcategories

The emerging themes from the data were the relationship between memorising and improvising, the relationship between sight-reading and improvising, improvisation strategies, duo improvisatory performance and small group dynamics. Within each

theme, there were subcategories. The first theme was the relationship between memorising and improvising. Issues included the role of memory and memorisation strategy application and associated difficulties that emerged when improvising as a duo. The second theme that emerged from the data analysis was the relationship between sight-reading and improvising. The interview investigated the views of the musicians about the role of sight-reading skills in improvisation and the similarities and differences shared between these two musical skills. For the improvisation strategies theme, the researcher's focus was on issues such as the role of individuals in classical and jazz genres and solo improvisation applications. In addition, strategies that the musicians applied in duo improvisation performance were examined. From the theme of small group dynamics, the researcher investigated on how the role of leadership, individual characteristics and small group identity could influence the learning process of improvisation as a duo.

6.3 The relationship between memorising and improvising

The role of memory is significant in improvisatory related activities. Experienced improvisers discussed the importance of memory in their interviews and of how they developed and valued their skills and knowledge in relation to memory. From the experimental data, expert improvisers demonstrated a range of memorisation strategies, such as dual activities, playing through, slow practice, chunking and building up sensory motor patterns. These are discussed in the sections that follow.

6.3.1 The Role of the memory

The capacity of memory

The expert jazz improvisers from the experimental study expressed the importance of acquiring a rich collection of the domain knowledge, e.g. the understanding of harmony progression. The experts reported that they had developed a vigorous analytical skill in processing sound and the knowledge was stored in long –term memory. This process

of using domain knowledge in memory was reported to be significant for professional jazz improvisers.

> "I always tried to listen to hear what people were playing in their records, like pianists were playing these chords, then what that was like…what are those notes. Then you have these recognition things, probably highly related to memory as well that I now have found that I have this big kind of arsenal kind of sound I can recognize. I know that is a link to my memory anyway" (Jazz expert)

Additionally, the professional jazz improvisers from the semi-structured interviews confirmed that they used effective strategies such as improvising shorter musical phrases to enhance their memory when working with their fellow musicians. The problems of forgetting could prevent a successful group improvisation performance. Professional improvisers applied their memory as part of their essential skills during performance.

> "When I compose for my band, I used to do it on a computer. I just write what I hear in my head straight onto a paper. And now I tend to write improvising thing, the little things I like and I will write them down. This drummer and I, we analyzed what we do, things that we like. At the same time, we have to memorise it. When we go along in group improvising, it's quite a good way to edit it. You can't write something for very long because when you get to the end of it, you have already forgotten the beginning. (Jazz expert)

Developing automaticity in memory

Professional improvisers from classical and jazz backgrounds in the interviews described the necessity to be able to access their memory automatically. This enabled them to apply in the musical knowledge and resources in a short space of time. For example, a classical organist described how aural and motor-sensory memories become automated when improvising.

> "It's like I got into the lift, I know an exit is on the sixth floor but I don't consciously think about it. You just automatically press floor six. There is something that is operated in an automatic way. I know that pattern; my figures will go into that pattern and knows what it's going to sound like. It's like driving a car." (Classical expert)

Similarly, it was significant for the jazz expert improvisers to be able to access their aural memory automatically. As performance events occurred in real time, there was no space of time to consciously retrieve particular domain knowledge. Experts demonstrated the need to develop their skills and knowledge to high levels that they became automated and stored securely in their memory. This involved a deep commitment of time and effort in order to reach this level of automaticity.

> "The best players will hear something and it will come out of them automatically. You know it involves a lot of hard work to get there. Then it becomes purely the means of getting the musical sound out of their head." (Jazz expert)

6.3.2 Memorisation Strategy Application

The strategies which the participants used in the memorisation task were mostly problem solving. Apart from the dual activities, the rest of the strategies were aimed at enhancing memory.

Dual Activities

One of the jazz participants sang the melody from a particular section as well as playing the notes on the piano when he practiced memorising the jazz music piece. Singing the melody out loud at the same time as feeling the notes on the instrument seemed to help him to remember aurally as well as visually. For instance, he started to practise the melody from bars 1-4 by singing and playing on the piano. (I's memorisation practice, DVD ex 12)

Playing Through

The classical violinist played through the whole piece in order to be familiar with the structure of the music during the group practice before carrying out the memorisation task performance. This strategy aimed to increase sensory-motor memory by increasing the pace of physiological adaptation to the musical piece. Eventually, the violinist

practised by playing through the whole piece in one go from memory before offering it for performance. (K's Memorisation practice, DVD ex 11)

Slow practice

The participants from both classical and jazz backgrounds used slow practice when memorising. The violinist K slowly practised a particular section of the short musical composition. His focus was on each note rather than a section. Meanwhile, he also added extra notes that were not written from the given music stimuli. (see K's Memorisation practice, DVD ex 12)

Chunking

Chunking was adopted as a means of improving a particular section within the music. The classical violinist chunked two specific section bars 3 to 4 and bars 5 to 6 in the jazz piece and concentrated on memorising all the musical features from these two chunks. For instance, he practised bars 3 to 4 for several times until he felt satisfied. (See Kevin's memorisation practice, DVD ex 12)

Sensory motor patterns

The classical violinist demonstrated how he formulated sensory motor patterns by feeling the notes on the strings. This constant movement in feeling the instrument and building up the regular fingerings enhanced kinaesthetic memory. He tried to memorise the piece by physically feeling the notes silently on his strings, at the same time working out the fingering. (Kevin's Memorisation practice, DVD ex 11)

This emphasis on sensory motor patterns may be related to stringed instruments where more physical adjustment is needed compared to pianists'. The pianist reported that he needed to use his aural memory in order to memorise properly.

Combining Memorisation Strategies

Both jazz and classical musicians combined more than one strategy to enhance their memory when practising during the experiment. Kevin the classical violinist applied three different memorisation strategies. He played through the entire composition using pizzicato technique while trying not to look at the score. He took away the written musical stimuli before the practice session. This was in addition to using chunking and kinaesthetic memory. (see K's memorisation practice, DVD ex 12.)

The jazz pianist also combined strategies when memorising musical pieces. He chunked a particular section, the beginning of a musical phase and at the same time continued to repeatedly play them on the piano. He went back to the beginning of the first melodic phrase and practiced up to bar three repeatedly. He continued to practice these 6 notes by repeatedly playing them at a slow speed. (See I's memorisation practice, DVD ex 12.)

6.3.3 Errors and Difficulties

Memorising from notation

The difficulty that the expert improvisers encountered in the memorisation task performance was to memorise from notation. This issue was raised in the interviews. For some musicians learning to memorise from notations was less important so the skill in relation to such functions was less well developed.

> "In organists' tradition, the emphasis is more on sight-reading because of the number of times you have to accompany choirs, it is more important to develop sight-reading skills and memory skills. As a consequence I got very little memory skills. Even for a piece I know terribly well, I have probably will not play from memory." (Classical expert)

The role of improvising in the memorisation performance: 'I just made it up'

Another surprising example from the analysis of the task performance was the difficulty that the jazz pianist encountered during the memorisation task. He spent considerably

more time than the others in preparing for the memorisation task. He only managed to remember three out of the nine bars of a Blues like melody. The accuracy from his memorisation task performance was quite poor.

> "[Name] has remembered 3 out of the total 9 bars. However, he has used improvising for most of his memorisation task. In most of the places he was doing the slow practice on, he did not manage to remember any of the notations during the performance. His improvisation demonstrated similar harmony progression as the original composition. This indicated that he remembered better the harmonic structure. The participant laughed when he completed the task and commented: I just made it up!" (I's memorisation performance to a jazz piece, DVD ex 13)

When he could not remember what to play from the notation, he improvised. 'I just made it up' meaning that he used improvising during the memorisation task performance to fill in the temporal space to compensate for his lack of specific memory. He remembered the harmonic structure of the music piece, which enabled him to improvise. Remembering chords and remembering each note accurately seemed to involve different skills.

The difficulty in developing aural and visual memory spontaneously

The jazz improviser reported that he spent most of his time listening and memorising from recordings. He does not usually memorise from notation for improvisation performance. Therefore, his skills in relation to memorising from notation were not efficiently developed. [I] relied on his aural ability to memorise which he confirmed from reflecting on the memorisation task.

> "This took a bit of time. It is just that it takes time to connect to my ear. I needed it to help me to memorise." (Jazz expert)

The other a professional jazz musician, C, confirmed this.

> "It just takes a while to learn it, because I want to learn it by ear, to be able to memorize it properly." (Jazz expert)

Memorising aurally was emphasized more than memorising visually in the performance practice. Therefore, more difficulties and errors occurred when memorising from notation.

6.4 The relationship between Sight-reading and Improvising

One of the aims of the experimental study was to investigate the relationship (if any) between sight-reading and improvising. Expert improvisers from classical and jazz backgrounds showed that sight-reading and improvising have some shared characteristics. For instance, professional classical improvisers particular organists are required to develop their sight-reading skills to a high level.

6.4.1 The Role of Improvisation in Sight-reading

In the experiment, an experienced jazz improviser demonstrated his habitual behaviour of using improvising in sight-reading. When the participant was sight-reading a jazz piece, he was improvising at the same time. Furthermore, he seemed to be really comfortable and natural with such a notion. The improvisation that [I] created while he was sight-reading was sophisticated as he added harmony throughout to support the nine bars melody by using offbeat Blues style like chords. Additionally, he introduced new phrases that made the structure of his improvisation coherent. The experienced jazz improviser demonstrated dual activities, sight-reading while improvising as he saw both skills as an essential part of his improvisatory skills.

[I] added harmony in the left hand throughout the whole 9 bars. He also added his own phrasing into the 9 bars blue exercise. Bars 1 to 4, he made those bars into a mini introduction. As for the left hand harmony, he added an offbeat, blues-like chord, a motif he developed which went through the whole piece. The ending he altered and created also had blues/jazz-like characteristics, which were a spreading chord passage. (I's sight-reading performance to a jazz piece, DVD ex 14)

6.5 Duo improvisation Strategies

The role of duo improvisation in classical and jazz genres is very different in terms of musical style. Classical duo improvisation has often been used in early music and contemporary music performance practice, but relatively little research has been carried out in this area. Improvising with another fellow musician is a standard performance practice in jazz genres.

6.5.1 Conscious and Unconscious influences

In the third element of the experiment, K the classical violinist unconsciously demonstrated the influence of contemporary classical music in the duo improvisation. He was given a choice by his duo partner of choosing the style for duo improvisation performance and decided on a 'free style'.

> The Pianist: Free improvisation or on the blues?
> The Violinist: Let's do free improvisation.
> (Duo 1's Small Group practice to duo improvisation performance, DVD ex 15)

During the duo improvisation performance, K improvised musical phrases which had a similar harmony and structure to Vaughan Williams or Britten's' compositions. Furthermore, these particular musical phrases became the main feature in the duo improvisation, as the pianist supported the phrases by coming up with contemporary classical-like chords. The violinist opened up a long phrase, which had similar harmony to Vaughan William's work. The pianist copied the phrase twice with a chord like bass motif. The piece ended with the violinist going up in an arpeggio, slowly fading away and the pianist echoing in the same fashion. (Duo improvisation performance, DVD ex 18)

Examples from the semi-structured interviews and the experimental study demonstrated that there were conscious and unconscious influences from contemporary music compositions amongst classical improvisers. One of the classical expert improvisers formed a duo improvisatory performance group, which did not limit

their musical style to a particular genre. Contemporary music inspired the duo to start improvising in free style.

> "During my study at the music conservatoire, I met a piano player. We started to do contemporary music with small pieces from Messian. Suddenly when we finished our rehearsal, our energy was still there so we started improvising; just doing it, just playing which in a way is intriguing." (Classical expert)

The classical expert improviser was particularly interested in the different musical idioms used in contemporary music. He drew ideas from musical themes and structures and adapted them in his duo improvisation.

> "We were fascinated with all kinds of contemporary composers and their specific languages and energy. We were not jazz or classical. We were in a way listening to contemporary composers, using our ear trying to translate and develop a kind of style." (Classical expert)

He also applied this strategy when improvising with jazz ensembles. He listened to the musical themes and produced melodic improvisation based on that. This approach differed from the approach jazz musicians used, as they tended to listen to the chords.

> "When I started to play with jazz ensembles, I listened to the theme and made my playing from the themes, not the chords." (Classical expert)

6.5.2 Timing

In the experiment on duo improvisation practice, K and I spent significantly less time on practising. They did not even try out their group improvisation on their instruments. However, they did discuss the timing – how long the performance would last. The duo agreed on improvising for a couple of minutes.

> I: Hmm… Is it going to be a short one a long one?
> K : Up to you.
> I: A short one then, a couple of minutes.

(I and K's preparation to duo improvisation performance, DVD ex 15)

The evident from the semi-structured interviews demonstrated that timing was important when improvising as a duo. One of the classically trained improvisers expressed how he applied timing as a practical strategy. He used timing to outline the structure of the duo improvisation.

> "We improvised as a duo so everything is in sync in a way. I worked out timing for doing things, expression, asserting silence in situations so it's all about timing." (Classical expert)

6.5.3 Communication

Communication with the audience could determine the success of an improvisatory performance. Experienced improvisers believed in creating a meaningful duo improvisation in order to communicate well with the audience. In the experiment of improvising as a duo, I and K improvised to each other as if they were having a conversation. The violinist began with a questioning phrase and the pianist answered by repeating this musical phrase with the support of the harmony. This questioning and answering strategy was applied more than once during the duo improvisation performance.

The pianist started to play an open chord, spreading into an arpeggio, then the violinist followed by a long phrase. The pianist copied the phrase from the violinist and repeated two times with bass chords too. The violinist opened up with another long phrase, the pianist copied the phrase two times with a chord like bass motif. The piece ended with the violinist going up in an arpeggio, slowly fading away and the pianist echoing in the same fashion. (Duo improvisation performance, DVD ex 20)

There was also supporting evidence from interviewing the expert musicians. For instance, J believed that there should not be any pre conceptions about the audience's musical preferences. He suggested that when musicians alter their improvisation for

someone else's musical preference, they also compromise the aesthetic of the spontaneous creativity. The communication between the improvisers and the audience should be open.

> "I think it is all about communication with other people. I think sometimes musicians have patronizing view of what the audience will like or dislike. We should tone down a bit because people do not get used to it. But I think people will respond to people when they are honest with their music. Even if it is something they never heard before, or something they make from out of nowhere sounded like an odd punch of noise. People will respond to it." (Jazz expert)

Further evidence of communication strategies applied during duo improvisation performance was from of the experienced classical improviser who suggested that a well-cultivated duo improvisation performance should also try to communicate within the existing context. The performance platform for the duo improvisation should not only be limited to the musicians and the audience, but also the creative environment. This philosophical approach from the classical expert improviser demonstrated that duo improvisation communication could also be extended to life style and society at large. He believed that this led to a higher level of creative thinking in duo improvisation.

> "My approach is to make sure that every moment in my playing, I am connected to the context. Just playing but not connecting is not enough. I am interested in context, imagination, the conversation afterwards, the place I am playing so I no longer play in regular venues. I want to be connected with everything because it helps to create the story that we are in" (Classical expert)

6.5.4 Acquiring collective musical styles

When improvising in a small group, it was essential to acquire knowledge of the collective musical style that would enable the improviser to be creative in real time. In the experiment, K the violinist decided on the musical style of the duo improvisation performance, which indicated that he was confident with improvisation in a free style rather than improvising on the Blues. I the pianist who was responsible for the

harmony in real time performance seemed to have acquired a collective knowledge about different musical styles. He showed that he had no preference for improvising within either of the musical styles, free style or the Blues.

6.5.5 Talking about the Doing

The evaluation strategy 'talking about the doing' was not used by the musicians participating in the experimental study. It was commented on by the classical expert improvisers in the semi-structured interview in evaluating their duo improvisation performance. In particular, the evaluation focused on issues such as harmonic rules, timing and structure. By "talking about the doing", musicians aimed to improve their improvisation by constantly reflecting on their performance. This strategy also allowed the musicians to develop a common language in communicating as a duo.

> "I developed one simple exercise. It was talking about playing. It is about developing a language about the playing. This continuously reflects playing and developing all kinds of language on improving improvising. By sharing a common language as well as noticing what actually happens in real time makes it possible to improve what you are doing without losing the spontaneity." (Classical expert)

6.6 Errors and Difficulties in learning to improvise as a duo

The skills of developing collective domain knowledge and acquiring the right level of self critical attitude were the main difficulties the novice musicians from a classical musical background experienced when learning to improvise as a duo.

6.6.1 Domain knowledge acquisition

Experienced classically trained musicians had some have difficulties in improvising as a duo. This was caused by the fact that they had not had enough experience in acquiring other kinds of musical knowledge apart from their own specialized domain. The skill development and knowledge acquisition required to become a professional classical

musician does not require knowledge of the jazz genre. The experimental duo of the classical flautist and jazz trumpeter, has demonstrated the difficulties the classical musician experienced when learning to improvise in the jazz genre. As the duo decided to improvise based on the Blues style, the classical flautist E realized that she did not know which harmony to use in order to carry out duo improvisation with her fellow musician.

> E: I really cannot do it!
> R: Literally – look! Think about it! The scale is E flat, G flat, A flat. Do you want to practice the scale now? E flat, G flat, A flat, A nature, B flat, D flat and E flat.
> (R and E's preparation to duo improvisation performance, DVD ex 17)

Her duo partner who was a more experienced jazz improviser tried to help by pointing out what harmony to use and which notes to play.

6.6.2 Expectation: 'This is not meant to be perfect'

Another difficulty encountered in the classical musicians' learning to improvise as a duo during the experiment was having high expectations towards the improvisation performance. The classical musicians expected to develop a highly sophisticated improvisation. When the genre was jazz, the musician involved did not have the right level of skills and knowledge to measure up to her expectations. This then became an obstacle and she started to lose confidence. Furthermore, it also increased performance anxiety that can have negative impact on improvisation. In the case of E, her fear of making mistakes and producing a poor quality of improvisation has her cautious about engaging in the improvisation task.

> E: It is pretty hard.
> R: That is the idea! This is not meant to be perfect or anything. It is just to see how we do it. That's all.

For E being a classically trained flautist, the expectation of performance was about perfection. The expectation of the jazz musician was very different. J the jazz bass clarinettist understood the difference between these two musical backgrounds and what it meant in terms of performance.

> "When I played music with improvisation, when things go wrong that you make it can be a good thing. When you play a clarinet concerto and something goes wrong it can never be a good thing." (J, jazz bass clarinettist)

6.7 The Effect of Small Group Dynamics

This section considers the effect of small group dynamics on the learning process of improvising as a duo. In particular, issues such as the style of leadership and member characteristics influenced the experience of the duo improvisation performance.

6.7.1 The Style of Leadership

Supportive leadership

In a small group such as duos, the style of leadership can influence the improvisation performance and it is also essential to the process of learning to improvise. In the experiment, Iv the jazz pianist presented himself as a supportive leader in his group. The example from I and K's duo improvisation performance has shown how the more experienced improviser of the group can lead the improvisation by giving a solid supporting bass harmony, i.e. chords and motifs. In the pianist and violin duo free improvisation, it was the violin leading the melody line; it created the shape of the phrase. The pianist acted in a supporting role by copying the melody the violinist came up with, repeating those couple of times and adding the bass harmony on top of them. This constructed the outline of the whole improvisation. (Duo improvisation performance in free style, DVD ex 18)

Ian's supportive leadership enabled his duo partner Kevin to have more creative freedom and not to be penalised by the limited skills and knowledge when improvising as a small group.

Strong leadership

Another example demonstrated a different scenario in terms of leadership. In the duo of R and E, the leader R presented strong leadership during the duo improvisation performance. Although his duo partner E had less experience in improvisation, R's attitude was not sympathetic to his partner. E had to negotiate hard to establish which harmony rule the duo was going to use. Due to R's strong leadership, there was a conflict in choosing between D modal scale to D minor scale and the musical style the duo should improvise in. In the end, the leader refused to negotiate further and started the duo improvisation performance. E, the classical flautist, had no choice but to join in the performance several seconds later. The strong style of leadership influenced the duo improvisation performance. It impacted on the creative musical choice by applying strict harmonic rules and the musical genre preference. R's leadership style limited the other group member's choice in creating the improvisation. This might have been caused by the fact that the musical background of the two members in the duo was different in terms experience, skills and knowledge acquisition. Under these circumstances, R the jazz trumpeter may have more right to assert strong leadership.

> The leader: 'What is the matter with you?'
> The Flautist: 'Sorry!'
> The Leader: 'OK! OK! How about starting with D modal scale?'
> The Flautist: 'How about D minor scale?'
> The Leader: 'All right – let's do D minor with flat 9^{th}?'
> The Flautist: 'But is this supposed to be in Classical or Jazz style?'
> (See DVD ex 19)

6.7.2 Individual characteristics

The Risk Taker

The characteristics of group members may be influential in the way in which they learn to improvise as a duo. Different characteristics could mean different creative approaches being adopted. Experienced improvisers constantly seek new creative ideas and are prepared to take risks to find their inspiration. A risk taking characteristic is a life style behaviour and philosophy for creativity. The aim is to take risks to find new sounds and musical structure' so that each improvisation performance in different. The expert improviser referenced the tradition of *'avant garde'* as a way of finding new experiences.

> "The problem with musical improvisation is that when the players focus too much on the thing itself then it is isolated in the air. It is not an island. You can exchange ideas with the people in the island, but how about the people you don't know, that's what I do not like. I like to do very difficult thing in a way, trying to challenge my experience in a subtle way, to people who follow, in a contemporary way you know so I am not afraid of small *avant garde* which is running in front." (Classical expert)

Similar characteristics were also found in the experienced jazz improviser James. He expressed his risk taking characteristics in a philosophical way. He talked about wanting to be 'on the edge' and 'more and more extreme' as an approach to achieving originality when improvising in a small group. James seemed to suggest that in order to be creative in improvisation, he needed to be more open-minded in searching for new combinations of sounds and structure.

> "The more and more I play music, I want to work with people who surprise me and do things I never expect. I don't want to settle into what is comfortable. I want to be on the edge, to be completely aware of it all the time. More and more extreme if you like." (Jazz expert)

6.7.3 Small Group Identity

In the experiment, the duo of I and K performed a clearly communicated duo improvisation performance. There was no inhibition between the improvisers in creating a piece of meaningful improvisatory music. The duo formed a united identity, which transferred to the improvisation they created. The performance demonstrated that I and K listened to each other tentatively and tried to imitate each other's musical personality. Each musical phrase and accompaniment seemed to emerge well and it gave an impression of a coherent duo improvisation.

I the pianist started to play an open chord and K the violinist followed with a Britten like melody. The pianist copied the phrase from the violinist and repeated twice, at the same time adding more bass chords. The violinist continued with another melody and the pianist imitated the phrase as well as repeating it twice along with the bass motif. The performance ended with the violinist going up on an arpeggio and the pianist echoed in the background. (I and K's duo improvisation performance, DVD ex 20)

6.8 Summary

There were considerable differences in the performance of the duos in the various tasks. One duo spent the longest time in applying memory skills, but achieved the poorest level of percentage in accuracy of memorisation performance. This outcome was not affected by their relative expertise of different musical genres. Sight-reading was performed the most effortlessly during the experiment. Accuracy was highest for this behaviour. A comparison of the accuracy of memorisation performance and sight-reading performance shown that both expert improvisers of classical music background scored the lowest in accuracy of performance in jazz genre (see Table 6.2 below). This demonstrated the effect of lack of expertise in particular musical genres on achieving accuracy inmemorisation and sight-reading performance. The limited relevant domain knowledge acquisition can prevent high levels of skill development in the learning

process to improvise as a duo. However, the jazz improvisers were able to perform well in all the tasks. This was probably because they also has experience of classical training

Table 6.2: A comparison of the percentage of accuracy in memorisation and sight-reading performance amongst the novice improvisers with a classical music background

The novice improvisers of classical music background	The percentage of accuracy in memorisation performance of the jazz piece	The percentage of accuracy in memorisation performance of the classical piece	The percentage of accuracy in sight-reading performance of the jazz piece	The percentage of accuracy in the sight-reading performance of the classical piece
The classical flautist	80	100	100	100
The classical The violinist	20	70	100	98

The role of memory seemed to be significant in improvisation. Professional improvisers from classical and jazz backgrounds were committed to self-regulated learning and skill training in order to develop a body of domain knowledge in their memory. This enabled the musicians to use the knowledge automatically, accessing their memory in real time improvisatory performance. Both classical and jazz improvisers applied a range of memorisation strategies to enhance their memory in relation to improvisation. The difference between professional improvisers from the classical and jazz musical backgrounds was in the approaches towards memorising from notation and memorising aurally. These two approaches required different sets of musical skills and abilities. It was found from the experimental study that the jazz improviser had difficulties in memorising from notation. Both classical and jazz improvisers agreed on the nature of the relationship between sight-reading and improvising, suggesting that

they share similarities in their characteristics. Sight-reading skill was part of the professional examination requirement for classical improvisers while the expert jazz improviser use improvisation in sight-reading. Additionally, prior expertise in different musical genres influenced the style of duo improvisation strategies. Classical experts may be more likely to 'Talk about the doing', while jazz expert do not. Further, issues such as communicating to the audience, performance identity and connecting to the context were significant in duo improvisation performance communication.

The effect from small group dynamics could also have impacted on learning to improvise as a duo. The experimental study demonstrated that a different style of leadership can influence the creative choice, musical structure and experience in duo improvisation performance. Similarly, personal characteristics amongst group members may be significant in relation to learning to improvise as a duo. Expert improvisers may exhibit the characteristics of risk taking which are a life style or personal philosophies for achieving originality in creating improvisation.

CHAPTER SEVEN:

LEARNING TO IMPROVISE IN AN ENSEMBLE

This chapter focuses on issues concerning how improvisatory skills are developed in a group context. It draws its analysis from group observation and interviews with novice and expert improvisers who have predominantly either a classical or jazz background who were placed in the position of having to improvise using a set of specially commissioned cross-genre compositions.

7.1 Elements in the group improvisation analyses

In this study, the elements of the group analyses were carried out in three stages. In the first stage, the researcher interviewed the group leader about his rehearsal plan for the new group composition. His plan covered technical rehearsal, expected group flow[3] and increasing expectations of creativity in the improvisation sections. Then an analysis was made of the relative amounts of time under each heading. During the sessions of group improvisatory rehearsals, the researcher kept records of the amount of time each individual musician attended each session and what they did. This provided an indication of the individual contribution to real time group improvisation.

[3] *Cf* Csíkszentmihályi, M. (1998). Finding Flow: The Psychology of Engagement With Everyday Life. Basic Books.

In the second stage, the researcher investigated the total amount of time that the ensemble spent on musical practice and group communication as a group across the five pieces. Additionally, the researcher adopted the framework of Poole's (1983) multi sequence model of 'musical structure', 'social structure' and 'communicative behaviour' to identify cognitive and behavioural components of change events in both the generative and exploratory processes (Finke et al, 1992) within the group improvisation data.

In the third and final stage, the researcher applied the framework found by Cunha and colleagues (2002) to examine significant factors involved in the change events of the group data, such as leadership, member characteristics, information flow, memory related factors, organisational configuration and resource (Cunha op cit:119-120) from the 'musical structure' of the group improvisatory performance and the interaction between the 'social structure' and 'communicative behaviour'.

7.2 The use of time in learning to improvise as an ensemble

7.2.1 The total amount of time spent in ensemble rehearsals

Fourteen musicians, (n=2) classical and (n=12) jazz musicians took part in this study. The amount of time that each member of the ensemble was able to spend in the group rehearsals varied and this was known at the outset. The bandleader had anticipated the availabilities of the group members within the overall performance plan and had employed five instrumentalists as deputies. Not all fourteen participants attended every single session and some of the group positions such as double bass, cello and violin were rotated between principle and deputy instrumentalists, as is considered a common practice in the jazz profession (Berliner, 1994). In traditions such as orchestras or big bands, there are deputy musicians filling in the positions in organizational music performance. Hence, the music material for the present study was only written for nine instruments, although altogether fourteen participants were involved in the rehearsals.

Overall, the musicians attended between (just under) two hours across the rehearsal period to (just under) ten hours (see Figure 7.1).

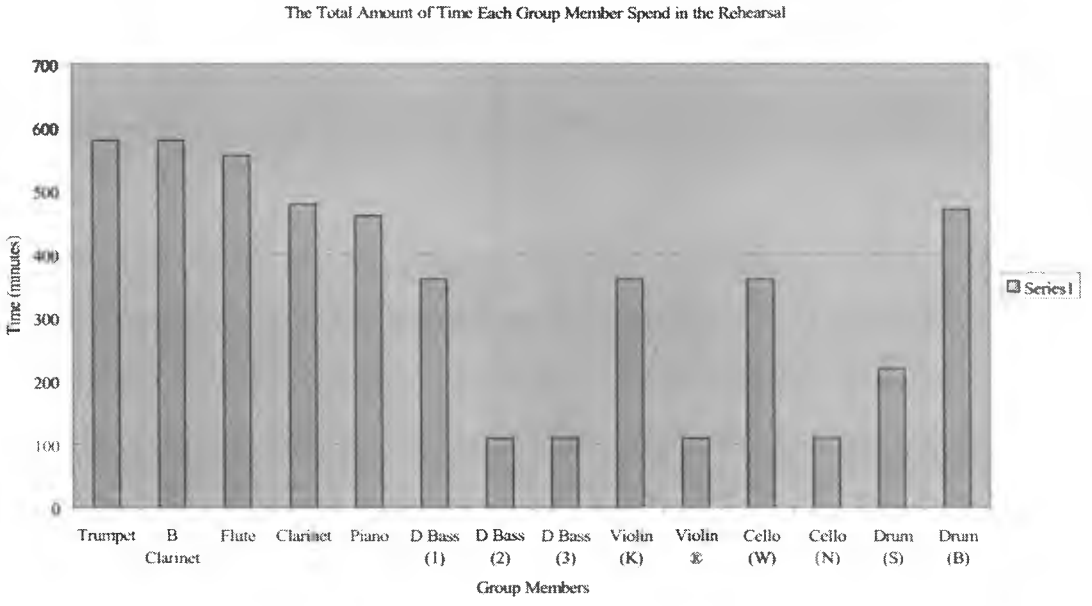

Figure 7.1: The total rehearsal time attendance for the fourteen individual performers

The intention was to note the above variation in relation to the subsequent contribution that each musician made to the group improvisation (see below).

7.2.2 The initial rehearsal time planning

The ensemble 'Fringe Magnetic' spent 11 rehearsals sessions learning to create a suitable improvisation within the marked improvisation spaces of the five newly composed musical pieces. These musical works had been specially commissioned as cross genre compositions for this particular study. The initial planning of each rehearsal session was categorized into four elements: learning, discussion, technical aspects and rehearsal by the ensemble leader.

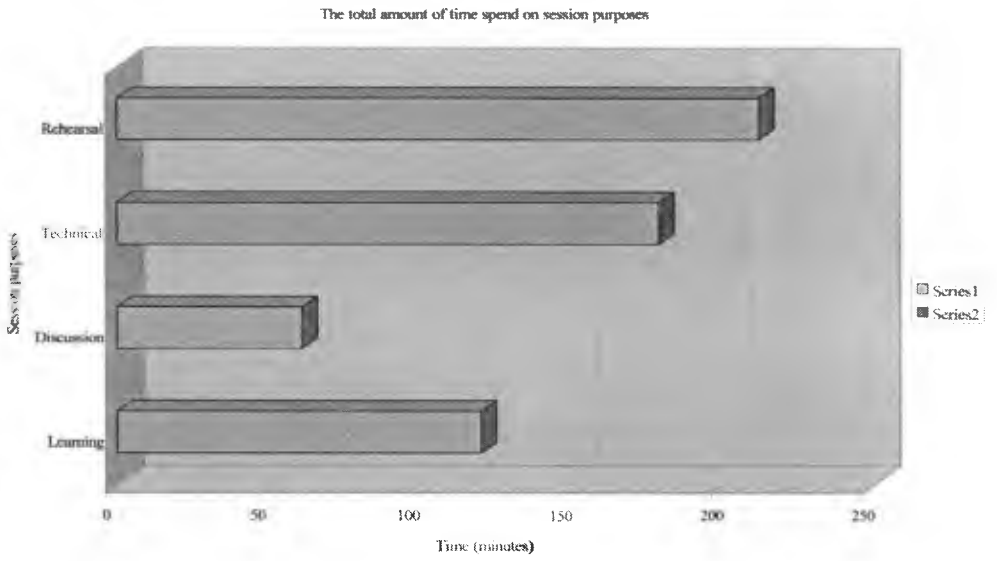

Figure 7.2: The initial planning rehearsal time frame by activity

The purposes of rehearsal sessions 1 to 3 were to learn the five original compositions. In sessions 4 to 6, the group planned to discuss issues such as instrumentation, technical requirements, compositional structure and interpretation in relation to improvisatory performance practice. Sessions 7, 8 and 9 were designed to concentrate on technical issues relating to the compositions. For sessions 10 and 11, the goal was to go through a performance practice, creating 'flow' within the group and training instrumentalists to fill in on different parts. Overall, the ensemble seemed to spend most of the time on rehearsing rather than explicitly learning (in the sense of seeking to gain mastery over the material in a structured way), discussing or dealing with technical issues as a group. In particular, it seemed to be the ensemble's leader/composer original intention to spend most of the time rehearsing rather than discussing issues with the rest of the group members. The leader reported that the reason for such an approach in the planning was that he was not able to anticipate all the difficulties that might be encountered in real time. There were numerous errors during rehearsals and different types and level of difficulties experienced by each instrumentalist.

The ensemble leader was observed subsequently to adapt to problems that occurred in real time when the group were learning to improvise. He discovered that it was not possible to keep to the initial rehearsal planning balance as he found that it took much longer for the group members to become familiar with the structure of the compositions after the first rehearsal session. This was evidenced in their comments during rehearsals of the perceived level of complexity of the five cross genre musical pieces. The conflicts between his initial planning intentions and real time problem solving occurred throughout the rehearsals. Perhaps because the five musical pieces were original compositions, the composer/ensemble leader was not able to anticipate some of the difficulties that the musicians might have as he had no prior experience of what might be difficult. In real time, the priority in the rehearsal sessions changed to enable the musicians to be able to play through the compositions, arguably in order to reach to next stage of their learning process, which was to improvise based upon the written notations.

> "I wasn't trying to rehearse a lot on bits of pieces or a specific part. I was just trying to get used to playing all the way through. There are still some places not as secure as I would like them to be. The main problem at the moment is people don't know what comes next or which session to follow through. You hit a new session, people are like 'Oh my God, where am I?'- that sort of thing. It is not as smooth in some of the places. My priority is to get people used to playing through the overall sound from all the different sessions of the composition." (R, the ensemble leader/composer)

7.3 Multi sequence model in a group improvisation process

7.3.1 Analysis of music rehearsal activities and communicative behaviour

Ensemble music rehearsal and group communication decoding

In the process of analyzing the video data samples (see Chapter 4 for methodology), the researcher used the analytical method of iterative refinement cycles that was reported

by Lesh and Lehre (2000). The researcher first reviewed all the video sessions and looked for significant events of change. After analysing all the footage, the researcher concentrated on eight video samples of selected sessions (five minute selections from four rehearsal sessions) as these represented a broad pattern of the systematic changes of events during the process of learning to improvise within the ensemble. The chosen sessions were from rehearsal sessions two, three, six and eleven, i.e. drawn from across the rehearsal programme, and were selected also to demonstrate a contrast in the way that time was used (see below). Each rehearsal was categorized into three types of event: ensemble practice, group communication, and music and communication. In each selected sample of five minutes (see below), one second was taken as one unit and allocated into one of these three categories: the symbol M as the code for ensemble practice, the symbol C as the code for group communication and the symbol B as the code for music and communication (see Table 7.1).

The analysis of the ensemble practice from the video extracts indicated that the group practiced (M) solely from the musical notation and none of the verbal and non-verbal communications were involved in musical communication. Musical notation was taken as representing the element of 'the musical structure' (Bastien and Hostager, 2002:21) which involves conventions and cognitions generated by music theory and compositions. The group communication (C) was coded for verbal and non-verbal communication amongst the group members and it represented 'the communicative behaviour' (ibid). Music and communication (B) were coded for the scenarios where the ensemble practice and group communication happened at the same time. Additionally, it represented as the element of 'social structure' (ibid).

Table 7.1: Categories for Decoding (M=group practice; C=communication; B=music and communication)

Ensemble Practice (M)	Group Communication (C)	Music and Comunication (B)

7.3.2 Timing between improvisatory practice and communication as a group

Sample 1: Second Rehearsal 00:00 – 5:00 (see DVD ex 21)

The second rehearsal was still very much in the early stages of learning. Three examples are offered to demonstrate differences in time use. Sample 1 was taken from the first five minutes of the second rehearsal. The patterns of Sample 1 (Figure 7.3) demonstrated a series of fragments in M, B and C. The beginning was dominated by the pattern of M, followed by a small amount pattern of B. As the rehearsal proceeded, the activity of B increased. This indicates that the ensemble listened to the leader's verbal communication and at the same time corrected errors by playing out the instructions given by the leader on their instruments. Pattern C was the smallest in size overall and appeared more in the second half of the fragment, this meant that the ensemble spent relatively less time on group communication at the beginning of the second rehearsal. The majority of the time was spent on ensemble practice. The musicians as a group, at this stage, were still unfamiliar with the musical themes that the group improvisation performance was based on, so more time was devoted to getting familiar with the musical themes.

In addition, instructions were frequently given out from the composer of the musical themes who was also the leader of the ensembles. Hence, at the beginning of the second rehearsal, the leader constantly corrected the errors that the group members made. A serious of short interactions between group communication and ensemble music practice were recurring as reflected from the fragmented patterns of M, B and C (see Figure 7.3), with talking and playing at the same time (B) dominant in the second part of this Sample.

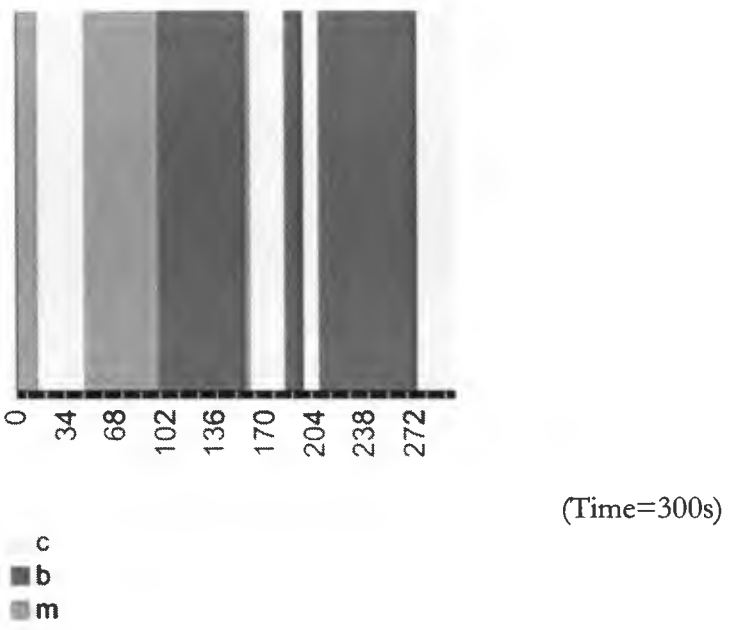

Figure 7.3: Sample 1 from the Second Rehearsal 00: 00 – 5: 00 (M=group practice; C=communication; B=music and communication)

Sample 2: the Second Rehearsal 5:00 – 10:00 (see DVD excerpt 22)

Sample 2 followed on directly after Sample 1 in terms of time. The patterns of Sample 2 show a different distribution of patterns M, B and C to Sample1. The amount of time spent in each activity increased as the time unfolded, but with music and communication at the same time (B) decreasing. For instance, the first pattern of M in Sample 2 lasted 15 seconds; however, the time duration of the last occurrence of M was 75 seconds. These changes indicate that the musicians appeared to become more familiar with the given musical stimuli and were able to concentrate solely on ensemble music practice (M) (see Figure 7.4).

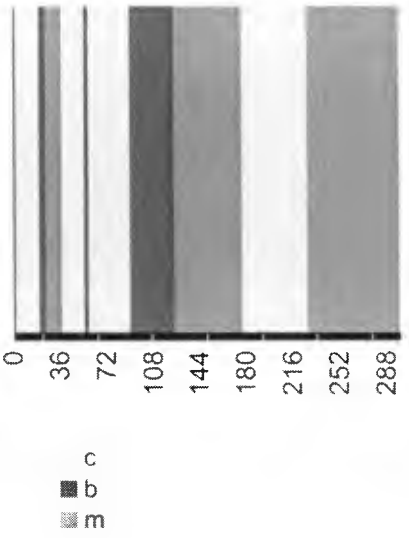

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Figure 7.4 Sample 2 from the second rehearsal (5:00 – 10:00) (M=group practice; C=communication; B=music and communication)

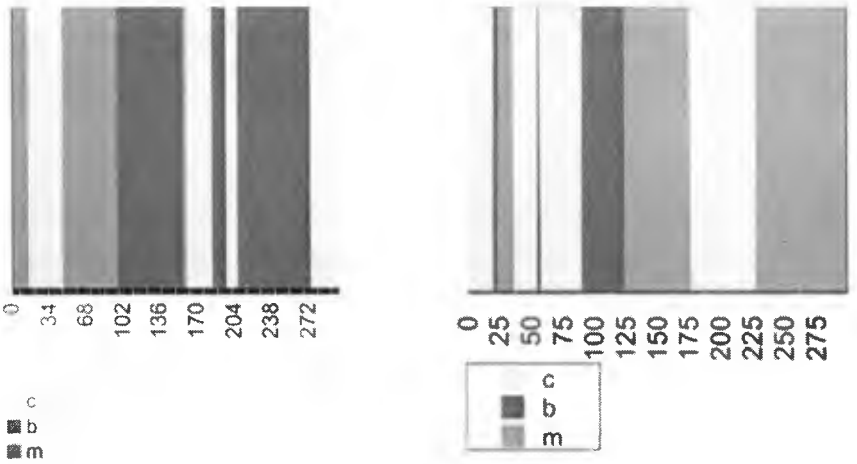

Figure 7.5: The first ten minutes of the second rehearsal (Samples 1 and 2 adjacent to each other)

When these two Samples are put next to each other (Figure 7.5) to reveal what happened in the opening ten minutes, it becomes evident that the group' initial musical practice (M) was relatively short. The group then focused on talking and playing (B) and

just talking (C) before shifting back to a bias towards musical practice in the final minutes.

Sample 3: the second rehearsal 39:28-44:30

Sample three is taken from at the end of the second rehearsal and shows an overwhelming proportion of the element M (ensemble practice) and is offered as a contrast to the opening periods (see Samples 1 and 2 above). The figure (Figure 7.6) indicates that the musicians had established some fluidity in playing the given musical themes (that include ensemble improvisation). Element C reduced dramatically in volume compared to samples 1 and 2.

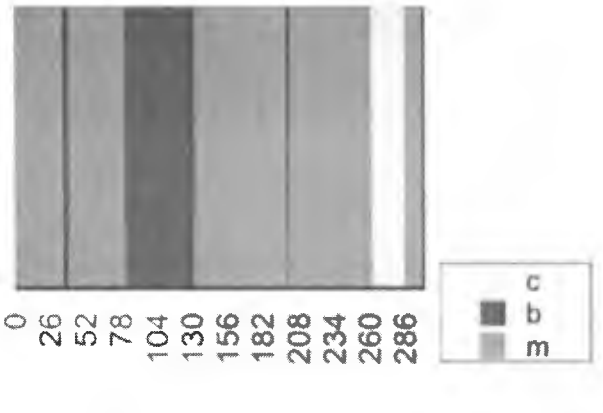

Figure 7.6 Sample 3 drawn from the end of the second rehearsal (39:28 – 44:30) (M=group practice; C=communication; B=music and communication)

This meant that the musicians spent much less time on group communication and much more time on ensemble practice. Hence, fewer errors occurred during the ensemble practice and there were an increased level of relevant knowledge acquisition amongst the musicians. Overall, comparing patterns M, B and C in figures 7.3, 7.4 and 7.5, the patterns revealed an increasing level of fluidity in ensemble music practice.

Sample 4 from the third rehearsal 00:00 – 5:00 (see DVD excerpt 23)

Sample 4 (Figure 7.7) is taken from the beginning of the second rehearsal and shows an overwhelming proportion of pattern B, relatively small chunks in pattern C and nothing of M. This indicates that the ensemble spent most of the time in group communication and ensemble practice, i.e., playing and talking. This is related to the musical focus being on improvisation during these opening minutes. The ensemble experienced difficulties in improvising on one of the musical themes 'Baron and Bump', and so the leader/composer undertook further in-depth discussion with the ensemble and tried to solve the problems that the group was having. The pattern suggests that there was an interconnected relationship between music and communication during this part of the group improvisation practice. The performers were mainly engaged in a large proportion of communicative behaviour with and without music playing.

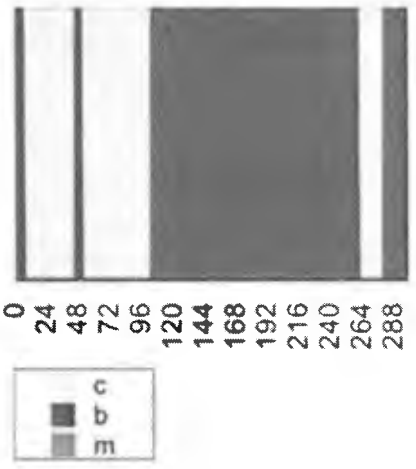

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Figure 7.7: Sample 4 from the third rehearsal 0:00 – 5:00 (M=group practice; C=communication; B=music and communication)

Sample 5 the third rehearsal 19:00-24:00 (see DVD excerpt 24)

From the Figure 7.8, it can be seen that this sample from the middle section of the third rehearsal consisted mostly of patterns of B and M. This indicates that the musicians had managed to start to play and improvise as a group and had begun to

overcome the difficulties that they had encountered earlier (see Figure 7.7). The C pattern (group communication) appeared mostly in the middle of this practice session. In this case, the C represents the ensemble leader giving instructions to the rest of the group on how to reduce the level of their difficulties. After the musicians spent nearly two and half minutes in talking to each other, they resumed playing – as indicated by the resumption of the M pattern.

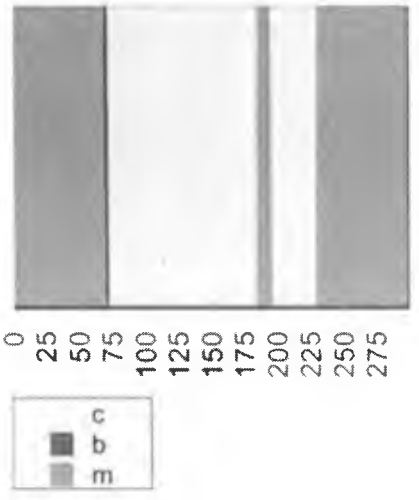

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Figure 7.8: Sample 5 from the middle of the third rehearsal (19:00-24:00) (M=group practice; C=communication; B=music and communication)

Sample 6 the sixth rehearsal 44:56 – 50:56 (see DVD excerpt 26)

The final 5 minutes section of the sixth rehearsal (Figure 7.9) displayed a large proportion of the pattern C – 'group communication' at the beginning this section, followed by small amounts of patterns B and M, and then finally music and communication (B). In this sample, the musicians communicated as a group for 165

seconds before the ensemble music practice restarted. The relatively rapid shifting between M and B suggests that the musicians still felt the need for talking and playing. The leader stopped and started several times in attempts to address the ensemble's errors.

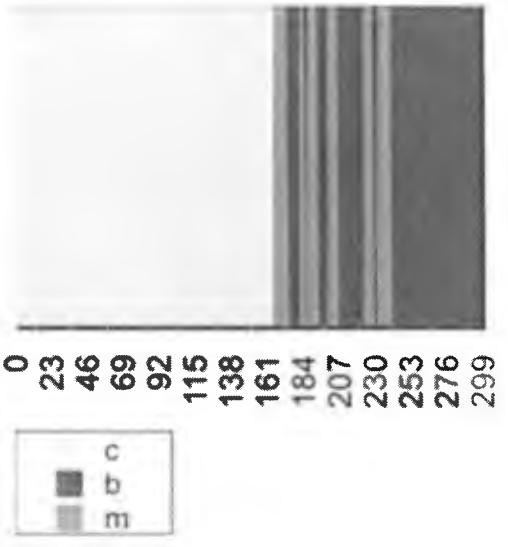

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Figure 7.9: Sample 6 from the end of the sixth rehearsal (44:56 – 50:56)
(M=group practice; C=communication; B=music and communication)

Sample 7 the eleventh rehearsal 00:00-5:00 (see DVD excerpt 28)

Figure 7.10 indicates that the musicians as an ensemble began the eleventh rehearsal by playing without the need to talk (pattern M). This was followed by a C pattern of group communication as the leader has stopped the ensemble music practice in order to give instructions about the playing and music. The subsequent B pattern of 'music and communication' then appeared and indicates that the musicians continued to play the music whilst at the same time communicating to each other as a group. The last pattern to appear in Figure 7.10 was the M pattern as the group communication stopped while

the ensemble music practice restarted. This dominant focus on practising without the need to talk continued until the end of the eleventh rehearsal.

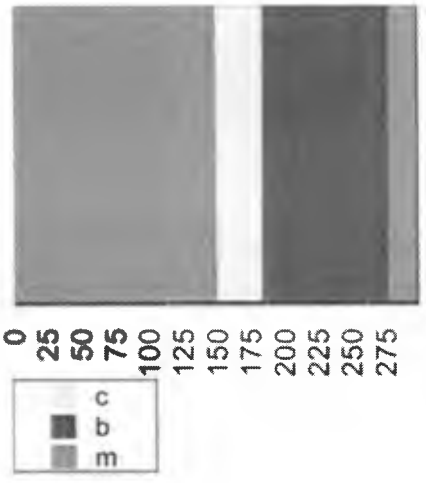

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Figure 7.10 Sample 7 from the beginning of the eleventh rehearsal (00:00-5:00) (M=group practice; C=communication; B=music and communication)

Sample 8 from the eleventh rehearsal 5:00-10:00 (see DVD excerpt 29)

Figure 7.11 demonstrates that the patterns of sample 8 taken from the second five minutes of the eleventh rehearsal were dominated by the M pattern – the ensemble rehearsal. This suggests that the ensemble had reached a turning point with their understanding and performing of the musical themes; the musicians had become familiar with playing the musical themes and were making fewer errors than previously. The musicians also spend much less time in communication, as a group and the B pattern appeared only once in this figuration. This suggests that the level of 'flow' has increased considerably during the eleventh rehearsal. The level of fluidity in ensemble music practice was high as the musicians were able to play continuously for the first time during these ensemble rehearsals.

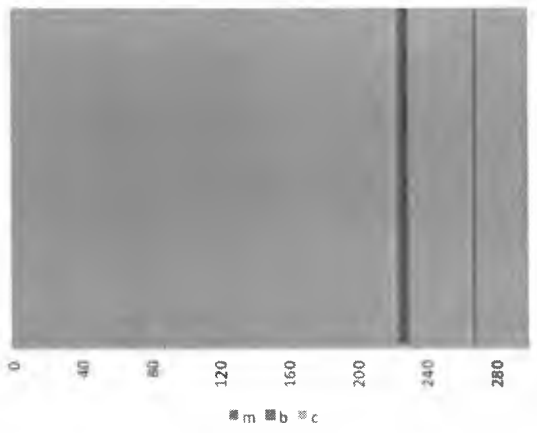

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Figure 7.11: Sample 8 the eleventh rehearsal (5:00-10:00) (M=group practice; C=communication; B=music and communication)

Overall, from the examination of 7 hours of video samples, multiple activities were evidenced during the ensemble improvisation process, often close together. The researcher applied an adaptation of the framework from Poole's (1983) multi-sequence mode, 'musical structure, social structure and communicative behaviour', to investigate all the relevant activities simultaneously. The data from the samples suggests that a 'break-point' (Poole, 1983) took place during the eleventh ensemble rehearsal session (see Figures 7.10 and 7.11) where the ensemble reached a turning point in the learning process of group improvisation. The group members established a more advanced level of group creativity and less instruction was needed from the ensemble leader. Comparing the eight samples (across figures 7.3 to 7.11), the level of group communication (C) decreased as the level of information flow and related mastery increased (Figure 7.12). Conversely, the mid point examples have a decrease in ensemble practice (just playing) as the level of errors and difficulties increased and members resorted to a higher level of group communication and leader intervention.

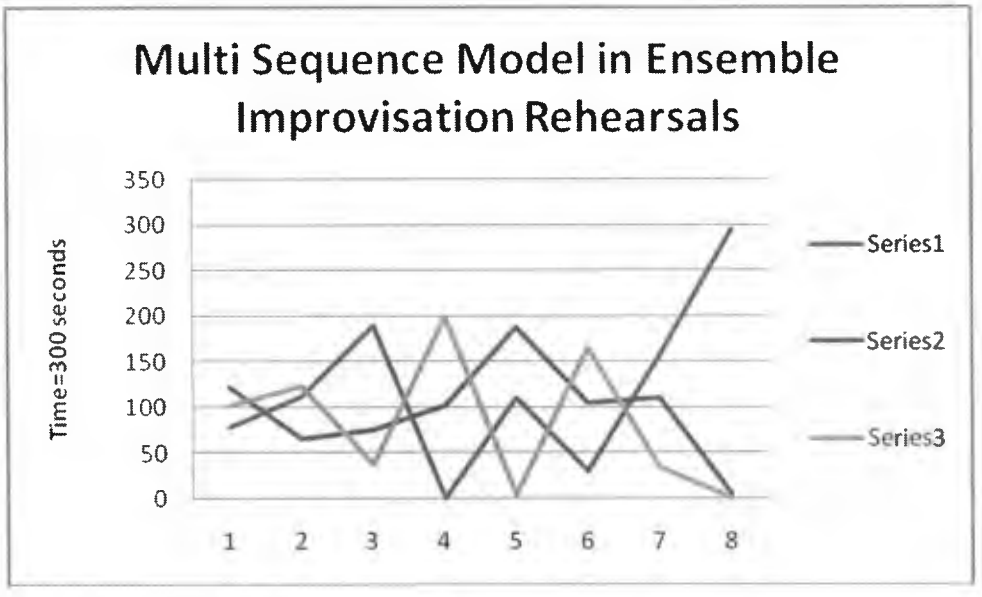


Figure 7.12 Summary of the selected 8 samples in ensemble improvisation rehearsals (Series 1=M: ensemble practice, series 2=B: music and communication, series 3= C: group communication)

7.4 Emerging Themes and Sub-categories

Following from a review of the ensemble music rehearsals and communication within the group, a range of emerging themes and sub categories developed by a process of iteration - themes such as resource, information flow, the effect of organization configuration, leadership, group improvisation strategies and ensemble improvisation performance were identified. From each of the emerging themes, there were subcategories as set out in Table 7.2. For instance, in the themes of 'Resource', the subcategories of 'Basic learning' and 'The style of the Groove' were included.

Table 7.2 Emerging Themes and sub categories

Emerging themes	Sub-categories
I. Resource	Basic learning The style of the groove
II. Information Flow	Communication within the group Effect of Information flow
III. Organization configuration	The creative environment Member characteristics Collateral structures within the ensemble 'Fringe Magnetic'
IV. Leadership	Leadership style Sharing leadership
V. Ensemble improvisation strategy	Negotiating the structure
VI. Ensemble improvisation performance	Duo improvising in an ensemble Trio improvising in an ensemble Performing individual solo in an ensemble

7.5 Resource

The ensemble applied two types of resource when learning to improvise as a group, aural and the visual. The aural resource was the emerging individual and group improvisation as the musicians improvised in real time that could feedback to influence the group improvisation process. The visual resource was the musical pieces that the ensemble used to improvise. The musicians discussed and worked on issues such as basic learning, the style of the groove and information flow. At the beginning of the ensemble rehearsals to group improvisation, the musicians began with basic learning and established the style of the 'groove' (see below). In the latter stage of the group learning, the ensemble developed deeper information flow from the visual and aural resources.

7.5.1 Basic Learning

Interpretive phrasing

When the ensemble used written notations as one of the musical resources for learning and creating group improvisation, interpretive phrasing was a significant part of the basic learning. As the compositions drew from two different musical genres, the interpretive phrasing influenced the stylistic outcome in relation to group improvisation. Phrasing in music could sometimes determine the style of the performance. The following example demonstrates that a group member from the ensemble discussed interpretive phrasing with the composer regarding a particular musical section (Figure 7.13).

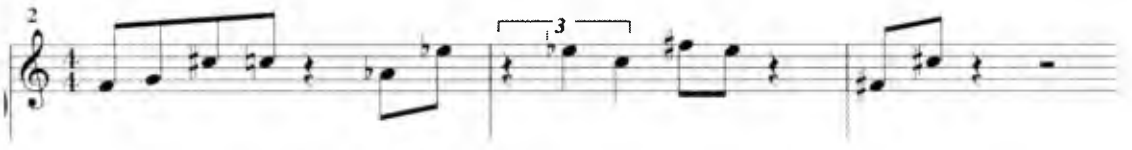


Figure 7.13: From the composition 'Round About' bars 1-3

The violinist K asked the conductor/ composer R about the interpretive phrasing by demonstrating on his instrument the style, 'slur'. The composer's first response was for the phrase to sound more *rubato*-like. The violinist K suggested further that he would apply the 'slurring' to some of the passages in the introduction of the piece 'Round About' (see Table 7.3). After hearing the demonstration from K, the composer R agreed that the style 'slurring' would be more suitable for those particular musical phrases. For a classically trained musician such as the violinist K, the interpretative phrasing in the basic learning included specific technical issues such as different style of bowing. The interpretative phrasing was significant as it helped to define which musical genre (classical and jazz) and stylistic musical knowledge to use in the improvisation based on the musical piece 'Round About' (see DVD ex 30).

Table 7.3: The second rehearsal, DVD excerpt 22

Time	Action	Verbal
10:05:22	The bass clarinettist: Tuning his instrument The flautist listens to violin, cello and drum The violinist demonstrates 'slur' and 'staccato' on his instrument The double bassist looks at the window The bass clarinettist plays his instrument	The leader: 'Maybe we should try it again.' The violinist: 'Do you want it rather 'slur' than 'staccato'? The ensemble Leader: 'Yes - almost like rubato.' The violinist: 'So just 'slurring' on some of the passage.' EL: 'Yes that is right.'

7.5.2 The Style of the Groove

The style of the groove was important as it provided a fundamental musical pulse for the musicians to create their improvisation in an ensemble. In this observational study, the ensemble 'Fringe Magnetic' went through an intensive journey in establishing the style of the groove, drawing on musical notations. The transcription in Figure 7.14 showed the ensemble has leant to establish the style of the groove for the piece "Baron and Bump" (see DVD excerpt 31).

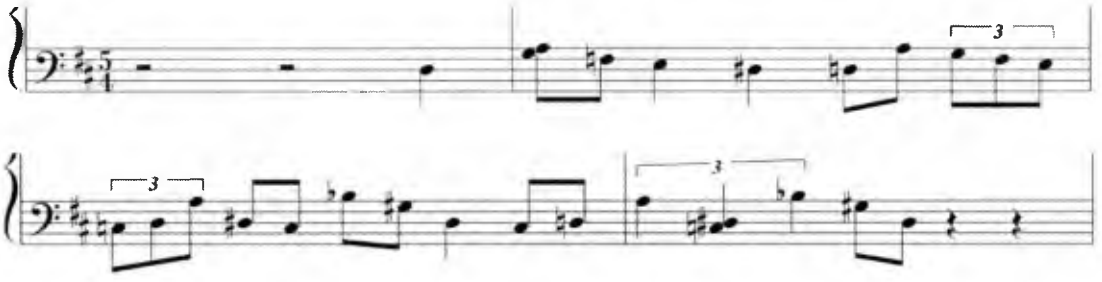


Figure 7.14 'Baron and Bump', bars 17 &18

Table 7.4: From the Third Rehearsal, DVD excerpt 24

Time	Action	Verbal
10:17:15	The rest of the group members looks at the written notation The bass clarinettist reads the musical score. The flautist reads the musical score The double bassist looks down on his part The Ensemble leader sings the rhythm and the melody of the groove to the bass clarinettist The clarinettist and flautist listen to the instruction about their parts. The cellist looks at the clarinettist' reaction Rest of the group members get ready to start to play again The ensemble leader demonstrates the tempo by clicking his figures The ensemble starts to play the groove again The ensemble leader sings the groove to the group	R: 'J can you come in on section A?' BC: 'I don't have anything in A." R: 'You should come in on the fourth bar of A.' BC: 'Oh yes sorry!' R: 'So I will go like this!' R: 'Then they answered it. Basically, when J played his phrase in the long note on 5/16 bar, you answered it next phrase.' C: 'Ya ya ya ya ya!' R: 'So let's do it again from section A and let's take it down a bit so it goes like this….' R: 'Two, Three, Four Five!' EL: 'It should be semi-quaver like.'
10:18:15		

This particular groove was played by a bass clarinet. The structure of the groove included a fugue-like rhythmic motif. When the musicians started to rehearse the groove, the bass clarinettist was confused with his part. The leader used multiple approaches to ensure the bass clarinettist and the rest of the group were familiar with the groove. For instance, he first described the structure of the piece 'Baron and Bump" as a 'question and answer' musical phrase. R wanted the group members to understand how the different musical parts related to each other. The ensemble leader also used non-linguistic communication, such as singing and clicking on his fingers to demonstrate the melodic and rhythmic nature of this particular 'groove'. Additionally, the ensemble leader asked the musicians to rehearse the 'groove' repeatedly until they became fluent in playing.

7.6 Information Flow

Information flow is significant in organisational improvisation. This communication generates links between individual and group improvisatory performances. The communication within the ensemble performance group 'Fringe Magnetic' showed that it had recognised the importance of 'information flow' whilst experiencing difficulties in creating the 'flow' within the structure of the musical stimuli.

7.6.1 Communication within the group

The ensemble leader acknowledged the difficulties that the group members experienced in achieving information flow during his reflections on one of the early rehearsal sessions. Retrospectively, he adjusted his rehearsal priorities and changed specifically to improving information flow. The approach the leader adopted was to focus on one issue at a time and to try to solve this before moving to the next issue. In the interview, he reflected on how he learnt that the group members had experienced difficulties in getting back into a coda and so had committed more time and effort to improve the 'flow' within the group.

> "People are getting used to what's happening at each session. Also cueing people where to go back to in a coda. I am talking specifically about that. Even more generally, things like jumping smoothly from session A to session B, there is still a certain amount uncertainty." (R, Group Interview 1)

The structure and the interpretation of the musical themes

Improving the knowledge on the structure and the interpretation of the musical themes can create better group 'flow'. During the third rehearsal, the communication between the ensemble leader and the group members demonstrated that the issue of information flow was at the centre of its communication. The ensemble leader explained explicitly the structure and the interpretation of the music stimuli to help the group members to improve their playing.

> "Shall we go towards clarinet solo in K then L the trumpet solo? And then we just play a bit more? L is sort of the first groove goes around, 8 bars of 5/8 and 3 bars of 3. Then Q, which leads the coda, coda is H. Alright? Everyone all right with it? Let's go from last groove of the clarinet solo. One, two three."
> (R, the leader)

Minimal Rules Imposed

To achieve 'information flow' within the group, the ensemble leader imposed minimal rules to enable group members maximise opportunities to improvise. During the second rehearsal, the ensemble leader decided to discuss issues such as rules and strategies for individual and group improvisation. The musical themes that 'Fringe Magnetic' were working on included an Irish flute solo improvisation followed by a group improvisation. The leader commented that 'you can be creative around that', indicated the imposition of minimal rules for the group improvisation.

> "What happened there is that there is a free section - free solo improvisation - played by the Irish Flute. She is going to play the melody with you which is free line by D [section D] and G [section

G] and the rest of it you can be creative around that." (R, ensemble leader)

Multi-modal Communication

The ensemble leader used verbal communication as well as body gestures to communicate with the group in relation to achieving 'information flow'. The example in Table 7.4 illustrates how the leader applied multi-modal communication.

Table 7.5: From the third rehearsal, DVD excerpt 32

Time	Action	Verbal
10:23:35	The ensemble practices 'Little Baban"	
	The clarinet plays his solo	The leader: 'Let's go on to the next one.'
	The leader draws a circle like gesture to stop the ensemble playing	
	The ensemble members listen to the leader's instruction	The leader: 'Basically six bars. I will count you in at the moment. One, two, three and J! One, two, three.'
	The clarinet starts his solo for the second time with the rest of the ensemble members plays the supporting groove	
10:24:35		

During the third rehearsal, the ensemble started to rehearse the section leading to the clarinet solo. When the solo came in, the supporting 'groove' made an error of not coming in on time. As a result, the leader stopped the ensemble's music playing by drawing a circle like hand gesture. Additionally, the leader also gave his verbal instruction as a cue for group members to start playing for the second time (see DVD excerpt 32).

7.6.2 Effect of Information Flow

Achieving 'information flow' was a rewarding experience for the musicians. An example from the interview reflected such a value. A musician from the ensemble commented on how he preferred to work on achieving information flow rather than slow practice or practicing chunks. The violinist referred to the term 'playing through' in an interview as the process of achieving information flow and expressed his enjoyment of the process. The process of working towards information flow gave the musician a sense of satisfaction. He referenced the information flow as 'having an overall effect'. For him, this meant an effective communication occurring between all the elements that were included in the group improvisation. When the sense of information flow improved, it led a higher level of creativity amongst the improvisers as the musical product from the group improvising was reported to become 'a different piece'.

> "I like playing through and performing pieces rather than pulling them apart. Sort of having an overall view of them - it's really good, really rewarding. Then it becomes a different piece. I think that's what I enjoyed today more than yesterday. It's like you only get to see a clue of what's happening. You don't really have a good idea of the overall effect." (K, Group Interview 2)

7.7 Organization Configuration

Organizational configuration was essential in terms of the effectiveness of the group improvisation. In particular, issues such as providing a creative environment and the collateral (subordinate) structure within the ensemble could have an effective impact on the group improvisation process. Additionally, how the leader and the ensemble members dealt with the group size in relation to improvisation could determine the quality of the group improvisation.

7.7.1 The creative environment

The leader of the ensemble commented that the 'safe and creative' environment that the ensemble 'Fringe Magnetic' was working in enabled maximum opportunities for group improvisation. The leader (who was also the composer of the original compositions) explained during the interview how he wanted the creative environment to be when he composed his music for the group. He tried to accommodate as many individual sounds from the ensemble as he could in the composition. Therefore, he wanted both the experienced and less experienced improvisers in the group to find it safe as well as inspiring when it came to spontaneous creativity such as improvising.

> "I suppose I know some of the people's sound very well, in particular E, D, R and J [real names provided]. I kind of have their sound in mind when I have written this set of music. Things they can stretch out, things they would like to play."
>
> (R: The composer/leader)

Difficulties in providing a creative environment

As the composer was also the ensemble leader of the group, he expressed in detail how he implemented his approach to provide an open and safe environment for the group members to work in and the difficulties that he experienced during the process. The interview demonstrated that he felt that it was a delicate situation to provide a safe creative environment and it was not always easy. However, as he believed in the importance of providing a creative environment for the group, he was willing to commit more time to achieve this objective.

> "Well you might think that this is a good thing or bad thing. I was not as descriptive in this as I should or might have been. For example, in some sessions, I might want everyone to play exactly what it is written, but in practice I am not at all. I am actually a bit more open about it. Therefore, it might take a longer time to rehearse, but I think it is a good thing to have to be more open and relaxed about it. It is a fine line to balance from a written script and letting people play what they want to play." (R: The composer/leader)

7.7.2 Member Characteristics

Elements within the member characteristics could influence the quality of group improvisation. Issues such as the diversity in group member relationships, the management of individual performance anxiety when learning to improvise as a group, each individual's performance experience and musical skills and the level of individual creativity are all believed to be essential to group improvisation.

Diversity in Group Member Relationships

The ensemble 'Fringe Magnetic' displayed diversity in its group member relationships. The group included musicians with different personalities and musical backgrounds that were likely to impact on group improvisation experiences. A group member reflected upon his thoughts and excitement of having diversity in the group member relationships. This was significant for him in terms of encouraging a high level of creativity during the group improvisation process.

> "We have a diverse musicianship, techniques and different backgrounds in our group which is quite exciting. I think everyone here has a very long history with music and the potential of making music together is immediate." (J, Second Rehearsal, 39:28-44:30)

Managing Individual Performance Anxiety

When learning to improvise as a group, individuals can experience different levels of performance anxiety. In general the group musicians seemed to demonstrate abilities in managing individual performance anxiety, but this varied for some individuals. During the third rehearsal session, two individual members were experiencing quite a high level of performance anxiety when improvising as a group. These two musicians managed their anxiety very differently. The clarinettist decided to be explicit about his anxiety to both the group and the conductor. He looked at the conductor when offering his view: "There was no point for the drum to play that way because no one can hear us." Meanwhile, the drummer was implicitly revealing his anxiety by reading his music score.

However, the clarinettist' comments apparently increased the drummer's performance anxiety (see Table 7.6). The drummer decided to resolve his emotional state explicitly by speaking out: "I can hear everyone." As soon as the clarinettist heard the drummer's reply, he offered to defuse this tension explicitly and commented, "Are you alright?" This treatment was effective as the drummer showed a much lower level of anxiety thereafter. He explained to the group the reason behind his approach by saying: "I can hear everyone. That is why I played that way." The rest of the group listened attentively to the two individual members' negotiations. Effectively, the anxiety experienced elsewhere by the other group members also visibly decreased as laughter appeared after the exchange of verbal negotiation between the clarinettist and the drummer.

This particular episode illustrated an important element in member characteristics as an approach of managing individual performance anxiety. At first, the group was experiencing a negative impact from an individual member resolving performance anxiety implicitly. Arguable, this reduced the quality of the group's improvisation. The tension was defused by another group member offering explicit treatment and by recognizing and dealing with the emotional state sensitively.

Performance Experiences and Musical Skills

Amongst the group member characteristics in the ensemble 'Fringe Magnetic', the different levels of individual performance experience and musical skills generated combinations of abilities in the group improvisation. During the ensemble rehearsals, two of the most common types of difficulties that individual member experienced were in their abilities to adapt to complex notation and assert individual creativity. The jazz specialist musicians tended to have difficulties with adaptation required for complex notation. In contrast, the musicians from a Western classical background found it challenging to produce individual creativity in a group context. These difficulties experienced by individual group members had a negative impact on the learning process to improvise as an ensemble.

Table 7.6: The third rehearsal, 1:31:55-1:32:55, DVD excerpt 33

Time	Action	Verbal
11:31:55	The ensemble leader looks at the cellist.	R: 'So you can sort of blend it in a bit and as soon as he plays it again.'
	The ensemble leader points at the violinist.	
	The ensemble leader sings the groove.	R: 'So quickly we should go from B section again.'
	The flautist, the clarinettist and bass clarinettist practice the groove.	
	The entire ensemble starts to play B section.	R: 'Ok - ready! One, two, three, four, five!'
	The ensemble leader makes rhythmic hand gestures to help the drummer.	
	The ensemble stops playing.	
	The clarinettist puts up his hand	
	The flautist practices the rhythm by tapping her hand on her thigh	R: 'Ok!'
	The bass clarinettist looks at his music	
	The flautist smiles nervously	
	The bass clarinettist and the double bassist stare at the drummer	C: 'There is no point in the drum playing that way because we cannot hear ourselves.'
		R: 'Alright'
		D: 'I can hear everyone.'
		C: 'Are you alright"
		D: 'I can hear everyone. That is why I play that way.'
11:32:55		

Tale 7.7: The third rehearsal, DVD excerpt 34

Time	Action	Action	Verbal
11:15:41	The drummer looks at the trumpeter with a distressed facial expression while playing his beat pattern.	The rest of the group were rehearsing by playing their parts	
	The ensemble leader sings the groove.		
	The drummer stops playing and listens to the ensemble leader.		
	The drummer demonstrates to the ensemble leader with an even quaver like beat	The rest of the group member stop playing	The ensemble leader (R): 'Maybe try a quaver with the rift.'
			r: 'Do not worry about the bar, just play the long five.'
			The drummer: 'Yep'
			R: 'No?'
			D: 'It is starting to get to me now. At some point I will be able to correct this.
			R: 'Will it help if we come back to it later?'
			D: Yes it will.
11:16:41			

Adapting to Complex Notations

The musicians experienced difficulties in switching from their habitual musical learning. The drummer from the ensemble was a jazz specialist and more used to reading different form of notations. As this ensemble rehearsal required reading complex notations, the drum part was written out in great detail. The performance practice was different to what jazz drummer was used to. During the third rehearsal, he experienced difficulty with the rhythm of the groove. The drummer tried to communicate his problem to the ensemble leader using non-verbal communication. His facial expression showed an intensive emotional state. The ensemble leader tried to sing the rhythm of the groove to help the drummer.

At this point, the drummer stopped playing his part and listened to the leader. The ensemble rehearsal was interrupted as the ensemble leader wanted to go over some errors in the drummer's rhythm as he found it difficult to play the correct rhythm from reading the written notation. The leader then suggested two different approaches. First, he wanted the drummer to play a quaver like motif. The leader commented: 'May be try quavers with the rift." This approach was applied for a short time; however, the drummer did not think the suggestion worked. The ensemble leader continued to suggest a second approach: 'Don't worry about the bar, just play the long five.' This meant that the leader wanted the drummer to forget about what was written on the notations and concentrate on playing five long beats as the motif. The drummer was not entirely happy about the second suggestion and he did not try to play five long beats after this suggestion. The ensemble leader sensed the discomfort that the drummer was experiencing and invited him to suggest a solution. This gesture opened the drummer up as he explained to the leader and the rest of the group his problems and his emotional state. The drummer commented, 'It has started to get to me now. At some point I will be able to correct this' (see Table 7.7). It seemed that after all the different suggestions from the ensemble leader; the drummer still felt difficulties in adapting his playing to the complex written notations in front of him. The drummer's notation reading ability also affected his emotional state as it increased the level of his performance anxiety. By implication, the relative inefficiency of an individual's musical skills and

performance experience can have a negative impact on the production of the group improvisation.

Asserting Individual Creativity to a Group Context – The Quality of Individual Creativity

The classically trained musicians from the ensemble had difficulties in asserting their individual creativity in a group context. Due to their lesser performance experience in group-based improvisation, there was confusion about the quality of individual creativity and a higher level of performance anxiety. For instance, the violinist sought advice from other group members who had more experience of group improvisation by asking the question, " Is there a bad improvisation?" This suggests that inexperience limited her ability to provide individual creativity in the group. Furthermore, another individual from the ensemble also reflected on the reasons behind his problem of being individually creative in a group.

> "I have very little experience in improvising with a large group. And I have this pre-judgement in my head about improvising. It's got to be perfect."

This individual's limited performance experience of improvisation was linked to his expectation of 'perfection' in performance, presumably based on his experience of the goals of Western classical performance derived from musical notation.

Improvisatory Performance Anxiety

Another member of the ensemble also found asserting their individual creativity in a group to be a challenge. This might have been caused by a high level of performance anxiety emerging in this unfamiliar context. The classically trained flautist admitted that she felt pressurised by the role of improvisation.

> "I actually felt a lot of pressure to do improvisation. Even though there was a lot of freedom to do improvisation with this music, I still feel a lot of pressure to do it. I was all right when I improvised the first time, but when we went through the same session again and I had to do improvisation again, I just got stuck."

7.7.3 Collateral structures within the ensemble 'Fringe Magnetic'

Creative Freedom and Individual Creativity

Within an organisation such as the ensemble 'Fringe Magnetic', the collateral structures could affect the quality of group improvisation. The leader of the ensemble asserted his approach of encouraging group members to have opportunities to show original creativity. He wanted to break away from the formal group performance practice by not imposing any rules and enable plenty of creative freedom.

> "In the improvisation session and the rhythmic session, people played their own phrasing which is great. I wanted to keep it fairly open for people to explore. I do not want to impose any strict rules upon them. It is nice people play their own voice, which is the purpose of this project." (R, Group Interviews)

Furthermore, the level of individual creativity appeared to be closely interconnected with the notion of creative freedom. The ensemble leader encouraged creative freedom in order to increase the level of individual creativity and he commented that, "I wanted to keep it fairly open for people to explore." The leader believed the ultimate goal was to enable a high level of individual creativity as he reflected: "It is nice people play their own voice, which is the purpose of this project." By increasing the level of individual creativity, he believed that it helped to develop a more effective group improvisatory experience.

Group Size

The factor of group size in organisational configuration can affect an individual member's ability to improvise. An example from the interview with one of the individual group members indicated that the larger group size had a negative effect on her ability to improvise. The flautist E found that working with a larger group size reduced her improvisatory behaviour as she had less experience in large group improvisation. Furthermore, it has also increased her level of anxiety.

> "A lot of the time, I practice improvisation with only one or two instruments, like piano or guitar. But today I have found myself working with a lot of musicians. I actually felt a lot of pressure to do improvisation. Even though there was a lot of freedom to do improvisation with this music, I still feel a lot of pressure to do it. I was all right when I improvised the first time, but when we went through the same session again and I had to do improvisation again, I just got stuck."

7.8 Leadership

Leadership is an essential factor in producing effective organizational improvisation. The style of leadership from the ensemble 'Fringe Magnetic' included the qualities of 'attentiveness' and 'sharing'. The leader displayed a constant concern for his group members' well being. The ensemble also developed a 'sharing' of leadership roles due to the complexity of the organisational nature.

7.8.1 Leadership Style

Attention to the group's need and emotional well-being

The approach of the ensemble leader demonstrated leadership style that was attentive. He tried to accommodate each individual group member's need during the rehearsals, as well as facilitating creative opportunities for group improvisatory processes.

> "I suppose in general it is more of a forward thing. For example, when I ask you if you want to make this a solo session or a rhythm session or do you want to make this as a groove rather than how to play this. What I do is to facilitate languages that jazz musicians or other classical musicians play in styles."

Another example from the video analysis of the ensemble rehearsal showed the attentive leadership from the conductor (see Table 7.8). During the second rehearsal, the ensemble was rehearsing the end of 'Baron and Bump". The musicians had had been repeatedly working on this particular section numerous times and found the rhythmic session difficult to play as a group. As the ensemble finished playing from the

written score, the conductor acted on his perception that the group was emotionally drained. He tried to communicate to the group by suggesting a change: '...I don't know if you want to do more on this piece or shall we move on to do something else'. This meant that the conductor wanted the group to stop rehearsing the piece 'Baron and Bump' and started up a new music piece 'Round About'.

Table 7.8: Extract from the second rehearsal, DVD excerpt 34

Time	Action	Verbal
10:03	The ensemble stop playing. The violinist looks at the leader. The cellist reads the music score so does the double bass and the drummer. The rest of the group members listen to the leader's comments. The double bass looks at other music score. The clarinettist looks through all his music score. The violinist and cellist start to play the introduction of the piece 'Round about'.	The ensemble leader: "Umm.." The drummer: "Yap - probably." The ensemble leader: "Slightly. Umm...maybe we shall just come back. I do not know if you want more or shall we move on to do something else? I just want to see how it felt and play a bit of it this week. Shall we play something else?" The bass clarinet: "Maybe we should do 'Round About'?" The leader: "Do you want to do 'Round About' instead?" The drummer, cellist and bass clarinettist: "Yep, Yes!"

Before the ensemble began to rehearse 'Round About', the ensemble leader first explained to the group the reason behind his previous rehearsal approach and sought further understanding from the individual members by saying: "I just want to see how it felt and play a bit of it this week." When the conductor suggested the ensemble change to another music piece 'Round about', most members eagerly agreed. Overall, the leadership from the ensemble conductor did not impose a rigid control upon his

group. In each step during the group improvisatory rehearsal, the leader's approach was to consider each individual's emotional state sensitively.

7.8.2 Sharing Leadership

During the ensemble rehearsals for the group improvisation performance, the leadership was shared between all the group members. This arose from the complex nature of the improvisation opportunities of the musical themes that the group improvisation was based upon. The clarinettist became the sub leader when he suggested to the ensemble leader that he share leadership by commenting: "You know what - maybe we should do this without you cueing it." The rest of the group members agreed in silence while listening to the conversation between the leader and the clarinettist.

After the leader agreed to share the leadership role with the rest of the group members, the clarinettist continued to comment on the approach that the group members should use when sharing leadership. The approach was to be coordinated with the structure of the musical themes. This meant that each individual would take over the leadership when leading at the bar section. The clarinettist commented to the group members: " Who has the first beat? Does James have the first beat of that bar?" However, he was not clear about the structure of the musical themes that the group improvisation performance was based upon. The leader tried to help him to get to know the music piece by answering his question and said: "It always changes." This appeared to help the clarinettist to clear up any confusion with the music pieces and he explained further the shared leadership approach to the group members. He suggested that: "You [cellist] start and then you [bass clarinet] start. The last one is you [violin]." In addition, the clarinettist used hand gestures to enhance his approach with the rest of the group. Each individual in the ensemble was observed to manage this form of shared leadership. Nevertheless, the ensemble leader remained as the primary leader, but with an open, encouraging style. The clarinettist, being more out spoken than the rest of the group, becomes the sub leader (see Table 7.9 DVD excerpt 35).

Table 7.9: 44:56-45:23, the third rehearsal, DVD excerpt 35

Time	Action	Verbal
10:43:52	The double bass looks at the clarinettist and listens to his comments	The clarinettist : "You know what - maybe we should do this without you cueing it."
	The violinist looks at his score	
	The bass clarinettist looks at the reader	The ensemble leader: "Yes, sure."
	The clarinettist looks at the bass clarinet and points at him	The clarinettist: "James has the first beat of that bar. Who has the beat on the first?"
	The bass clarinettist reads the score while listening to the clarinettist	The leader: "It always changes."
	The flautist looks at the violinist	The clarinettist:
	The violinist looks at the ensemble leader	"You [cellist] start and then you [bass clarinettist] start. The last one is you [violinist]"
	The double bass player loses interest and looks at the window	The leader: "Yes last one is K [violinist]."
10:44:52		

7.9 Ensemble Improvisation Strategy

A range of ensemble improvisation strategies were applied by the ensemble leader and group members. They were negotiating the structure and evaluation.

7.9.1 Negotiating the structure

Negotiating the structure was one of the essential strategies for producing an effective group improvisation performance. This involved discussion on timing, the style, the instrumentation and evaluation. For instance, the ensemble could choose between improvisation based on the themes of the music pieces and in free style. The following examples from the group observation demonstrate how the leader and the group members negotiated four group improvisation sessions in the second rehearsal.

Timing

During the session, the ensemble leader wanted the group to decide on the 'free sessions' (i.e., those moments when there was free improvisation). The individual members started to participate in the negotiation. The clarinettist was unsure of the numbers of group improvisations occurring in the beginning of 'Baron and Bump' and asked the leader "Are there four sessions?". This led to further explanation from the leader/composer about his version of the structure of these four group improvisation sessions.

> "The first one is very long and the second one should also be longish. No, no, sorry. The first one should be really long and the second should be a lot shorter. The third and fourth one should be quite short too. Basically the second one is significantly shorter than the rest of the session."

The leader referenced the four sessions in terms of the timing of the improvisation such as 'long' and 'short' sessions. His description on the structure of these group improvisations was a simple, imposed minimal rule upon them. This composition

design meant that the ensemble members had plenty of opportunities to insert their own individual creativity.

The Style: Free or Pre Planned?

After listening to the composer's requirements for the group improvisation sessions, an individual member began to negotiate the style of the group improvisation (see DVD excerpt 36). The clarinettist suggested that the shortest group improvisation should be in free style. This meant that it would be completely open for anyone who wished to do a free improvisation. As a group, the implication was that they should work out the other three group improvisations with more rules, as the clarinettist referred as 'three composed ones'.

> "I think the second session, because it is short, it is best to leave it open, anything could happen and then decide on three composed (planned) ones." (The clarinettist, second rehearsal)

Instrumentation

After the group decided on the style of the group improvisation, they started to plan for the structure of the instrumentation for the three, pre-planned long group improvisations. The bass clarinettist suggested that a combination of high and low pitched instruments would be effective.

> "I think the best thing to do is to say we are going to have low pitch or high pitch or combination of high and low instruments."
> (The bass clarinettist, second rehearsal)
>
> This led the leader/composer to decide to pick out two combinations of instruments for the first two longer length group improvisations.
> "OK- let's do violin, bass clarinet and drum kit. Second one is bass clarinet, piano cello, flute and trumpet." (The ensemble leader, second rehearsal)

Evaluation

The ensemble leader also evaluated the planning for the group improvisation once the negotiation for the structure with the group members was completed. Table 7.10

indicates that the leader invited the rest the group to evaluate the planning for the instrumentation during the second rehearsal. The leader first explained the order of the event before and after the group improvisation had taken place, using both verbal and non-verbal communication. After his demonstration to the group, the leader evaluated the instrumentation for the second short group improvisation in free style as he had some doubts about the sound production from the rehearsal (see DVD excerpt 37).

Table 7.10: DVD excerpt 37

Time	Action	Verbal
14:37:55	The group members listen to the leader	The ensemble leader: 'Basically we play that groove.'
	The ensemble leader sings the groove	R: 'There should be short free stuff then the groove again.'
	The group members listen to the leader	R: 'It is a lot heavier there. Now I do not know whether to prescribe certain instrumentation for the free session or just leave it complete open.'
	R sings the groove for the second time	
14:38:55		

7.10 Summary

Chapter Seven has been concerned with identifying aspects of the learning process when improvisation takes places in a group context. The analysis was taken from the group observation and subsequent interviews with the musicians from the ensemble improvisatory performance group 'Fringe Magnetic' over a series of eleven rehearsals. The researcher adopted the framework of an adaptation of Poole's (1983) multi sequence model, 'music structure', 'social structure' and 'communicative behaviour', to analyse the generative and exploratory processes. Additionally, the chapter also investigated cognitive and behavioural components of changing events in individual and group improvisation data. The research data suggest that the ensemble reached a

turning point in their learning process to group improvisation in the final rehearsal. As the rehearsals unfolded, the group members began gradually to establish a more advanced level of group creativity. Less instruction from the ensemble leader was needed. The ensemble eventually achieved a sense of 'flow' (of complete involvement in the activity) in the improvisation. Hence, the level of group communication decreased as the level of group 'flow' increased. Conversely, the level of group communication increased as the level of errors and difficulties increased.

Fourteen individual musicians participated in the group observational study. The amount of time each individual spent on ensemble improvisatory rehearsals was uneven. Some individual spent a mere two hours, but some other individuals attended the entire set of improvisatory rehearsals (just under ten hours). There were diverse differences between the initial rehearsal timing plans and the subsequent actual use of time. Across the entire period of the ensemble improvisatory rehearsals, the analysis of musical rehearsal activities and communicative behaviour, there was a systematic change. At the beginning of the rehearsals, group communicative behaviours dominated the group learning process of improvisation. As the musicians rehearsed as a group, a spontaneous change took in all three essential components, 'musical structure', 'social structure' and 'communicative behaviour'.

More specifically, a series of emerging themes and subcategories developed from the group observation analysis. These were related to resources, information flow, organisational configuration, leadership, group improvisation strategies and group improvisation performance. The ensemble 'Fringe Magnetic' made use of a range of visual and aural resources, such as written notations, individual groups of sounds and communication, to assist its ensemble improvisation rehearsals and development towards performance. When the ensemble was unfamiliar with its resources, the musicians spent a great deal amount of time discussing their basic learning needs. As the ensemble started to become familiar with its resources, the musicians focused on issues concerning the style of the 'groove' (a pattern laid down in popular or jazz music). Eventually, when the ensemble had gained some mastery of its resources to a

more advanced stage, the group members developed a range of verbal and non-verbal communication styles to create a higher level of information flow. The effect of the organisational configuration was an essential factor in the quality of the group improvisation. In particular, issues such as providing a creative environment, the influence of members' characteristics and the effect of collateral structures within the ensemble formed an influential impact on the group improvisation process. Elements of leadership such as the style of leadership and the sharing leaderships also became significant when improvising as a group. The group members and the leader applied a range of group improvisatory strategies that were aimed at issues, such as negotiation of the structure of the group improvisation and an evaluation of the applied strategies.

There were differences found between the novice and expert improvisers when learning to improvise in a large group context. The Western classical novice improvisers seemed to experience difficulties in basic learning, such as with the interpretive phrasing during the ensemble improvisation, probably due to limited performance experience in jazz genre. The jazz expert improvisers also made mistakes in performing the style of the notated groove. This could be caused by the use of complex (and unfamiliar) written notations during their learning process. In terms of information flow, the jazz expert improviser and ensemble leader was observed to apply a range of communication strategies in aid to achieve information flow. The Western classical novice improvisers seemed to benefit from the effects of information flow, but had less idea about developing effective musical communication in achieving information flow as an ensemble. In addition, the classical novice improvisers were believed to experience difficulty in improvising within the large group, whereas the jazz expert improvisers were more concerned in developing creative collateral (subordinate) structures within the ensemble.

CHAPTER EIGHT:

IMPROVISATION PERFORMANCE IN INDIVIDUALS AND TEAMS

8.1 The Geneplore Model and Improvisation Performance

This chapter is focus on the analysis of improvisation performance that includes eleven DVD selected samples from the self case study, experimental study and group observation study using the 'Geneplore' model and expertise theory. These samples comprised solo improvisation performance, duo improvisation performance and ensemble improvisation performance (see Table 8.1). In addition, the range of improvisation performances was selected from significant event of changes such as changes of time, the effect of musical genres and behavioural changes in relation to learning to improvise as individuals and teams.

Table 8.1: Selected samples of improvisation performance

Solo Improvisation Performance	Duo Improvisation Performance	Ensemble Improvisation Performance
1.My first solo improvisation performance based on 'chromatic classical theme', bars 1-12 (DVD clip 7)	6.Expert in duo improvisation performance in free style, bars 1-9 (DVD clip 19)	8. Bass clarinet and violin duo improvisation based on 'Baron and Bump', 11/4/2006 (DVD clip 38)
2.My twelfth solo improvisation performance based on 'chromatic classical theme (DVD clip 8)	7.Novice in duo improvisation performance in free style , bars 1- 12 (DVD clip 19)	9.Bass clarinet, double bass and flute trio improvisation 6/5/2006 (DVD clip 28)
3.My first solo improvisation performance based on chromatic blues, session 6 (DVD clip 9)		10.Trumpet solo in Baron and Bump (DVD clip 22)
4.My second solo improvisation performance based on 'chromatic blues'		11.Flute Solo in 'Round about' (DVD clip 26)
5.My twelfth solo improvisation performance based on 'chromatic blues (see DVD clip 10)		

More specifically, the analysis of the selected improvisation performance applied the criteria set out in Table 8.2. The criteria arose from the framework from the collective research of the 'Geneplore' model that provides an additional analytical method for the investigation of the connection between cognition and improvisation in musical performance.

Table 8.2: Analytical criteria on improvisation performance using the 'Geneplore' Model

Generative process	Exploratory process	The Preinventive Structure
1. The retrieval of existing structures from memory (Perkins, 1981; Smith, 1995; Ward, 1995, 1995) 2. The formation of simple associations amongst those structures (Mednick, 1962) 3. Combination of the two above (Baughman & Mumford,1995; Hampton,1987; Murphy, 1988) 4. The mental synthesis of new structures (Thompson &Klatzsy,1978) 5. The mental transformation of existing structures into new forms (Shepard & Feng, 1972) 6. Analogical transfer of information from one domain to another (Gentner, 1989; Holyoak & Thagard, 1995; Novick,1988) 7. Systematic reduction to which the existing structures are reduced to a more simplified version (Finke et al., 1992)	1. Searching for desired attributions in the mental structures (Finke & Slayton, 1988) 2. Metaphorical implications of the structures (Ortony, 1979) 3. Potential functions of the structures (Finke, 1990) 4. The evaluation of structures from different perspective (Barsalon, 1987; Smith, 1979) 5. The interpretation of structures as representing possible solutions to problems (Shepard,1978) 6. Various conceptual limitations that are suggested by the structures (Finke et al., 1992)	1. Symbolic visual patterns and diagrams (Ward,Smith & Finke, 1999:192) 2. Representations of three-dimensional objects and forms (Finke & Slayton,1988) 3. Representations of three-dimensional objects and forms(Finke,1990) 4. Mental blends of basic concepts (Hampton, 1987; 1988) 5. Exemplars of hypothetical categories (ward,1994,1995) 6. Mental models representing conceptual systems (Johnson-Laird, 1983) 7. Verbal combinations which indicate new associations and insights (Mednick, 1962)

8.2 Solo Improvisation Performance

8.2.1 Imitating from the given musical themes

My first improvisation performance based on a classical piece started off with a strong influence from musical themes of 'chromatic classical' as is shown in bars 1 to 12. The melody from bars 1 and 2 was identical to the melody from 'chromatic classical'. A similar case occurred in bars 5 and 6 as they were also identical to bar 4 in 'chromatic classical'. From bars 7 to 12, the influence from 'chromatic classical' decreased. For instance, in bar 12, the last three notes of its melody bore some similarity to the melodic fragment in 'chromatic classical'. The melodic characteristics from bars 8 to 11 were the new musical features.

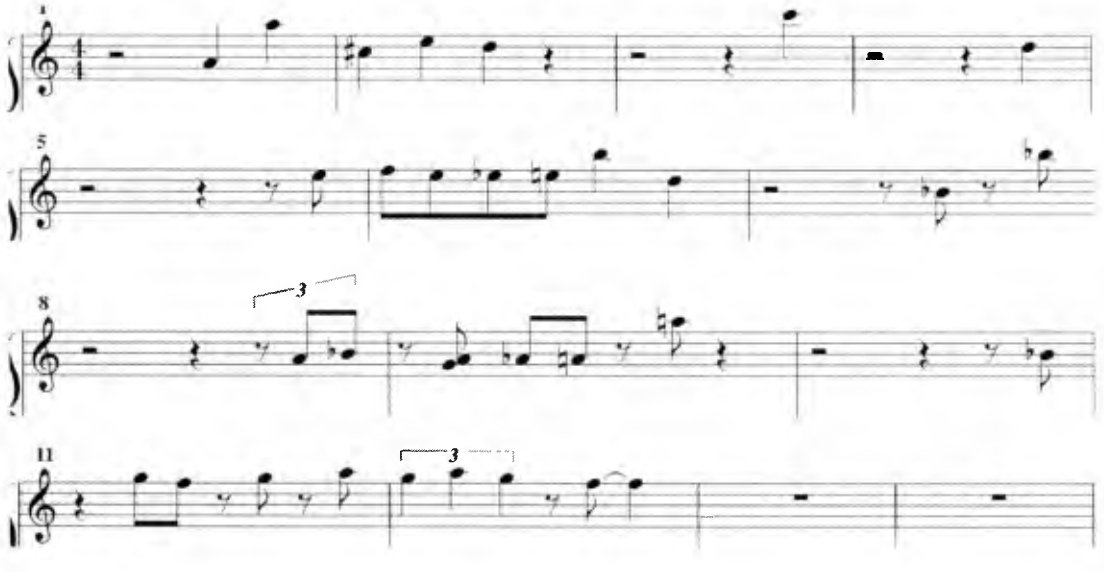


Figure 8.1: Novice first improvisation performance based on 'chromatic classical theme', bars 1-12

The transcript of my first improvisation performance based on the classical piece 'chromatic classical' demonstrated that I used my memory of practising from to create most of my improvisation (see DVD ex 7). There was evidence of an identical melody

from the given musical theme, such as the melody in bars 1 and 2. As the improvisation performance progressed, I began to create new forms, which were simple melodic characteristics from bars 3 to 7 linking the existing structure (bars 1and 2). The development of characteristics of the melody and the new musical structure revealed a combination of fundamental ideas was been applied to the improvisation performance. After the melody in bar 7, this solo improvisation performance entered a exploratory stage in which it produced a short two- bar phrases as the interpretation from the existing melodic characteristic in the musical structure in bars 8-9. The melody phrase 10 – 14 represented the pre-inventive structure as it was generated from a combinations of musical ideas emerged from the previous melody.

8.2.2 Structure improvement after self regulated practice

The musical structure in novice improvisation performance improved after a period of practice. Comparing my first and twelfth individual improvisation performances (Figures 8.1 and 8.2), the musical structure was significantly improved in terms of the development of the structure and coherence. In my first improvisation performance, there was no clear musical structure present, whereas, in my twelfth improvisation performance, the structure was constructed as AB form. The A section started from bars 1 to 9 and the B section was made up bars 10 to 14. Each section used different musical features and linked coherently to each other (see Figures 8.2).

Table 8.3 Novice first improvisation performance based on 'chromatic classical theme', bars 1-12

Generative Process Criteria	Solo Improvisation Performance	Exploratory Process Criteria	Solo Improvisation Performance	The Preinventive Structure Criteria	Solo Improvisation Performance
The retrieval of existing structures from memory (Perkins, 1981; Smith, 1995; Ward, 1995, 1995)	The melody in bars 1 and 2 were identical to bars 1 and 2 of 'chromatic classical'	The researching for desired attributions in the mental structures (Finke & Sayton, 1988)	None	Internal precursor to the final products (Ward, Smith & Finke, 1991:192)	None
The Formation of simple associations amongst those structures (Mednick, 1962)	Melody Line from bars 3 to 7	Potential functions of the structures (Finke, 1990)	None	Symbolic Visual patterns and diagrams (Finke & Slayton, 1988)	None
The combination of existing structures and formation of simple associations (Baughman & Mumford, 1995; Hampton, 1987; Murphy, 1988)	None	Evaluation of structures from different perspective (Barsalon, 1987; Smith, 1979)	None	Representation three-dimensional objects and forms (Finke, 1990)	None
The Mental Synthesis of new structures (Thompson & Klatzsy, 1978	None	The interpretation of structures as representing possible solutions to problems (Shepard, 1978)	1. melody in bars 8-9 as the interpretation of the existing musical characters	Mental blends of basic concepts (Hampton, 1987; Murphy, 1988)	The combination of the identical melody of the first 2 bars to the transformation of new melody in bars 8-12
The mental transformation of existing structures into new forms (Shepard & Feng, 1972)	None	Conceptual limitation that are suggested by the structures (Finke et al., 1992)	None	Exemplars of hypothetical categories (Ward, 1955, 1995)	None
Analogical transfer of information from one domain to another (Gentner, 1989; Holyoak & Thagard, 1995; Novivk, 1988)	None	Metaphorical implications of the structures (Ortony, 1979)	None	Mental models of conceptual systems (Johnson-Laird, 1983)	None
Systematic reduction reduced to more simpler version (Finke et al., 1992)	None			Verbal combinations of new associations and insights (Mednick, 1962)	None

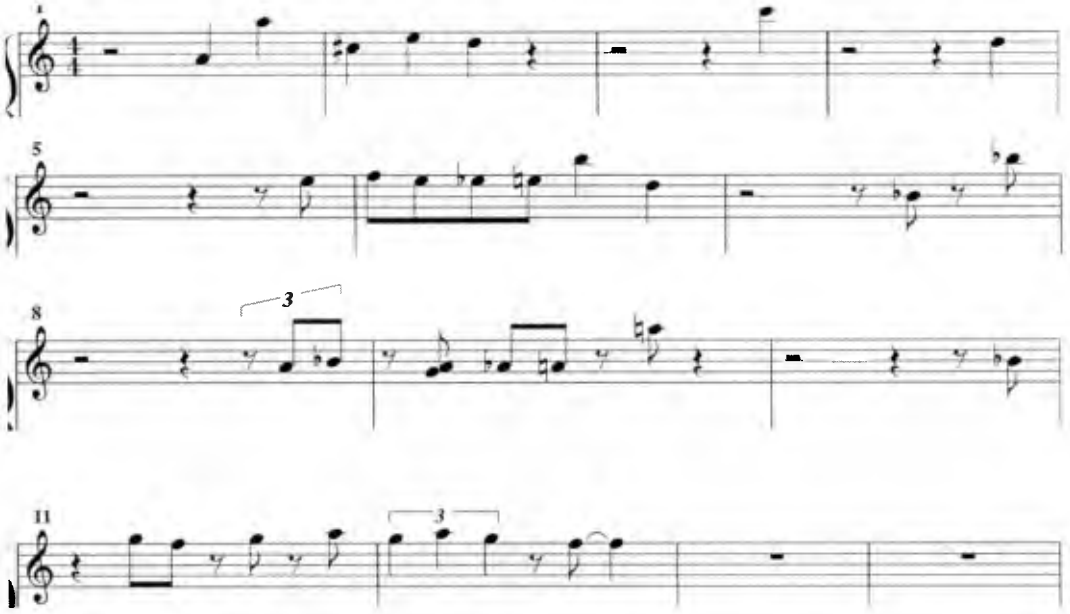


Figure 8.2: My twelfth improvisation performance based on 'chromatic classical Theme, bars 1-9, section A

The musical features in section A were reminiscent on the beginning of 'chromatic classical'; particularly the melody in bars 1 and 2. Gradually the influence of this section moved further away from the musical themes of 'chromatic classical'. The melody in bars 5 to 7 started to include new musical characteristics. By bars 8 and 9, the melody had led to section B, which was a completely new section consisting of a short melodic motif. This motif appeared three times, section B ended at bar 14.

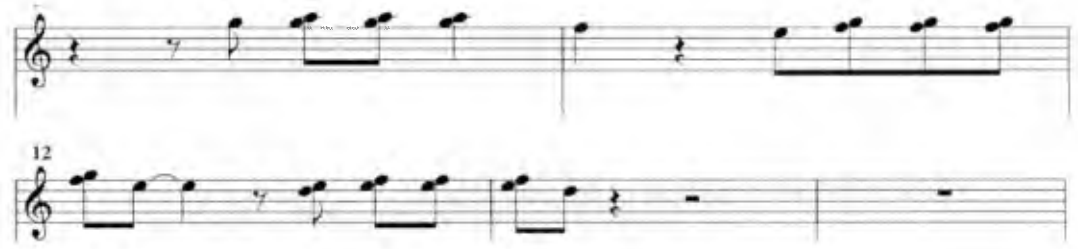


Figure 8.3 my twelfth improvisation performance based on 'chromatic classical Theme', bars 10-14, section B

The newly developed musical structure of my twelfth improvisation performance in the classical piece has demonstrated a conversion from existing musical concepts into new formation. The inspiration behind the creation of the new musical AB form was the result of deeper interpretation of existing musical structure from 'chromatic classical themes', which later became a solution for creating the twelfth classical style improvisation performance. After 12 weeks of self-regulated practice, I began to understand the fundamental system underlying the classical music piece 'chromatic classical themes' and applied it in the improvisation performance. The evidence shows that as the final product of my learning process to improvisation to a classical piece, I have alternated between generative and explorative processes in my creative process. In addition, the pre-inventive structure was based on the models of structure concepts of the classical piece.

8.2.3 Difficulty in switching to an unfamiliar musical genre when improvising to an unfamiliar genre

I had difficulties in switching to appropriate musical style when improvising to the jazz music piece. In my first improvisation performance using the jazz piece, I improvised to a different musical style than the musical genres piece 'chromatic blues' was based upon. As shown in the transcription of my first improvisation performance (see Figure 8.4), the melodic characteristic of the first four bars were chords, which were followed by a scale like passage. Then it repeated for the second time with a similar order of melodic characteristics. This demonstrates the strong unconscious influence of the classical musical style, which I have been trained for as a professional musician and the difficulties in my ability to switch to an unfamiliar musical style.

Table 8.4: My twelfth improvisation performance based on 'chromatic classical Theme'

Generative Process Criteria	Solo Improvisation Performance	Exploratory Process Criteria	Solo Improvisation Performance	The Preinventive Structure Criteria	Solo Improvisation Performance
The retrieval of existing structures from memory (Perkins, 1981; Smith, 1995; Ward, 1995, 1995)	None	The researching for desired attributions in the mental structures (Finke & Sayton, 1988)	None	Internal percursor to the final products (Ward, Smith & Finke, 1991:192)	None
The formation of simple associations amongst those structures (Mednick, 1962)	None	Potential functions of the structures (Finke, 1990)	None	Symbolic visual patterns and diagrams (Finke & Slayton, 1988)	None
The combination of existing structures and formation of simple associations (Baughman & Mumford, 1995; Hampton, 1987; Murphy, 1988)	None	Evaluation of structures from different perspective (Barsalon, 1987; Smith, 1979)	None	Representation three-dimensional objects and froms (Finke, 1990)	None
The mental Synthesis of new structures (Thompson & Klatzsy, 1978)	None	The interpretation of structures as representing possible solutions to problems (Shepard, 1978)	The new structure AB form represented as the interpretation of structures	Mental blends of basic concepts (Hampton, 1987; Murphy, 1988)	None
The mental transformation of existing structures into new forms (Shepard & Feng, 1972)	Created new structure as AB form. Section A includes bars 1-9 and section B ends at bars 14.	Conceptual limitation that are suggested by the structures (Finke et al., 1992)	None	Exemplars of hypothetical categories (Ward, 1955, 1995)	None
Analogical transfer of information from one domain to another (Gentner, 1989; Holyoak & Thagard, 1995; Novivk, 1988)	None	Metaphorical implications of the structures (Ortony, 1979)	None	Mental models of conceptual systems (Johnson-Larid, 1983)	The musical structure AB form represented as the model of the existing concept system
Systematic reduction reduced to more simpler version (Finke et al., 1992)	None			Verbal combinations of new associations and insights (Mednick, 1962)	

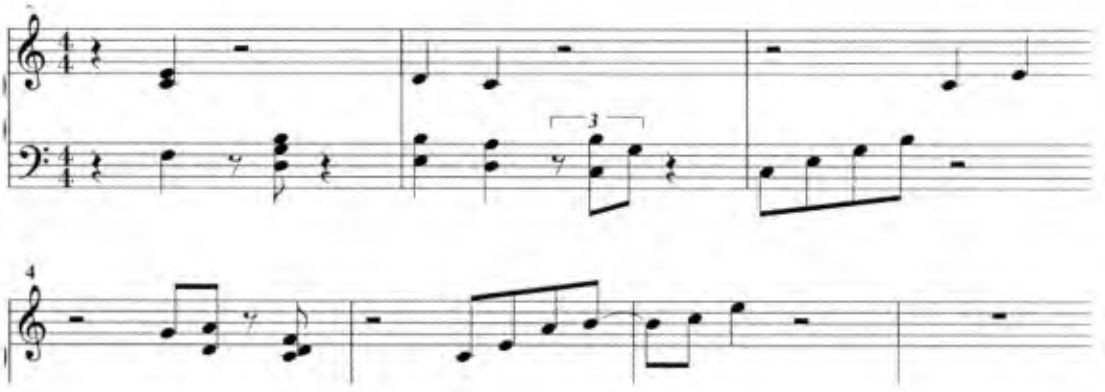


Figure 8.4 my first improvisation performance based on chromatic blues

The melodic characteristic of the opening chords and arpeggio were the representation of my unconscious exploration for preferred musical features when improvising to an unfamiliar music style. There was no evidence shown on the involvement of a generative process. This was caused by limited domain knowledge acquisition and related musical skills in the jazz genre. Therefore, I could not utilize information from the existing musical structure in 'chromatic blues' to be active in the generative process. Furthermore, the creative process involved in this particular performance ended abruptly at an exploratory stage, as it did not manage to generate its pre-inventive structure. This may have been caused by high level of performance anxiety (see section 5.9.2).

Table 8.5: My first improvisation performance based on chromatic blues

Generative Process Criteria	Solo Improvisation Performance	Exploratory Process Criteria	Solo Improvisation Performance	The Preinventive Structure Criteria	Solo Improvisation Performance
The retrieval of existing structures from memory (Perkins, 1981; Smith, 1995; Ward, 1995, 1995)	None	The researching for desired attributions in the mental structures (Finke & Sayton, 1988)	The choral features and arpeggio from bars 1-9	Internal precursor to the final products (Ward, Smith & Finke, 1991:192)	None
The formation of simple associations amongst those structures (Mednick, 1962)	None	Potential functions of the structures (Finke, 1990)	None	Symbolic visual patterns and diagrams (Finke & Slayton, 1988)	None
The combination of existing structures and formation of simple associations (Baughman & Mumford, 1995; Hampton, 1987; Murphy, 1988)	None	Evaluation of structures from different perspective (Barsalon, 1987; Smith, 1979)	None	Representation three-dimensional objects and forms (Finke, 1990)	None
The mental synthesis of new structures (Thompson & Klatzsy, 1978)	None	The interpretation of structures as representing possible solutions to problems (Shepard, 1978)	None	Mental blends of basic concepts (Hampton, 1987; Murphy, 1988)	None
The mental transformation of existing structures into new forms (Shepard & Feng, 1972)	None	Conceptual limitation that are suggested by the structures (Finke et al., 1992)	None	Exemplars of hypothetical categories (Ward, 1955, 1995)	None
Analogical transfer of information from one domain to another (Gentner, 1989; Holyoak & Thagard, 1995; Novivk, 1988)	None	Metaphorical implications of the structures (Ortony, 1979)	None	Mental models of conceptual systems (Johnson-Larid, 1983)	None
Systematic reduction reduced to more simple version (Finke et al., 1992)	None			Verbal combinations of new associations and insights (Mednick, 1962)	None

8.2.4 Difficulties in creating original musical ideas spontaneously

In my second improvisation performance (see Figure 8.5) from session 8, I tried to improvise in a jazz style and I managed to produce a jazz-like melody line. However, I experienced difficulty in producing original musical ideas, as the music transcription in figure 5 shows. The melodic characteristic line in these two phrases from bars 1 to 9 was a close imitation of the melody of the piece 'Chromatic blues'. This indicated that due to the lack of performance experience and musical skills in relation to improvisation, I imitated musical themes from the given stimuli 'Chromatic blues'.

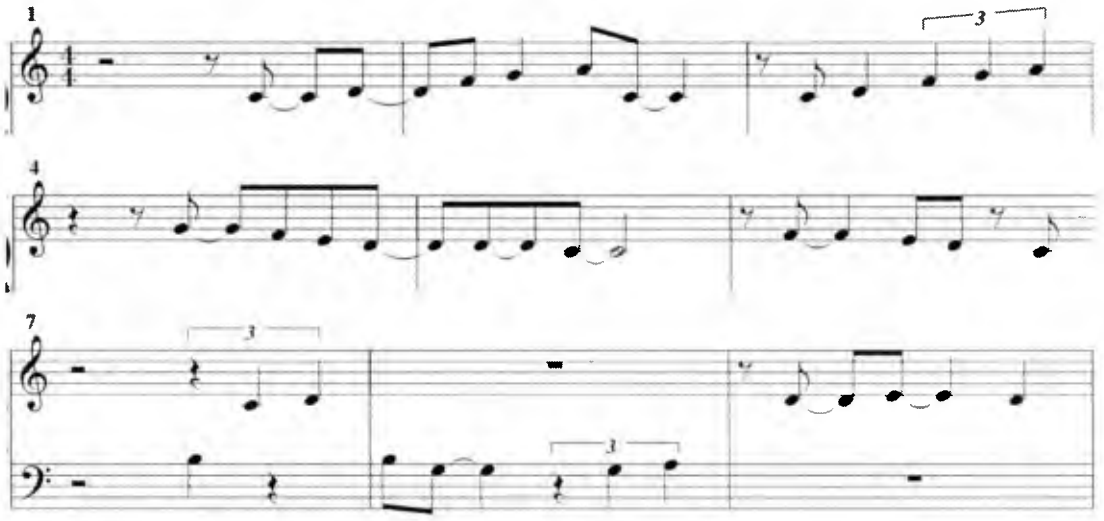


Figure 8.5 my second improvisation performance based on 'chromatic blues'

The generative process of my solo improvisation performance has demonstrated that I relied on my memory for the retrieval of the musical structure from 'chromatic blues' in order to produce an imitation in bars 1-3. I formed a short and simple melody in bars 4-6, which linked to the previous melodic phrase. Following from that, I created a new melodic phrase in bars 7 - 9. However, there was no evidence of an exploratory process. The pre-inventive structure from my second improvisation performance demonstrated a combining of the fundamental musical structure, which has been learnt from the jazz music piece.

8.2.5 Improvement on developing original ideas from 12 weeks of self regulated practice

Comparing my second and 12th improvisation performances based on the jazz piece, my ability to generate original musical ideas for solo improvisation had improved - as demonstrated on the musical transcriptions of these two performances from Figures 8.5 and 8.6. The twelfth improvisation performance produced a very different melodic characteristic to the given musical stimuli 'chromatic blues' apart from the first two bars. Furthermore, the melodic phrases from bars 3 to 13 were new musical features. In addition, these new melodic phrases show a coherent structure. This demonstrates an improvement in my developing original musical ideas after 12 weeks of self-regulated learning processes.

The generative process involved in my solo improvisation performance was the retrieval of existing musical structure, as the melodic feature in bars 2 and 3 and the first three notes in bar 4 were identical to the opening phrase in 'Chromatic blues'. The melody in the last two notes of bar 4 and the phrases in bars 5, 6, 7, 12 and 13 were the representation of a formation that linked to the previous melody. The solo improvisation performance was also influenced by the exploratory process, as the melodic characteristics in the phrase in bars 8-11 represents an interpretation of the existing musical structure in the 'Chromatic blues' that was the main musical feature in the creative process. The pre-inventive structure from this improvisation performance revealed a merger of basic musical concepts from the jazz piece 'chromatic blues'.

Generative Process Criteria	Solo Improvisation Performance	Exploratory Process Criteria	Solo Improvisation Performance	The Preinventive Structure Criteria	Solo Improvisation Performance
The retrieval of existing structures from memory (Perkins, 1981; Smith, 1995; Ward, 1995, 1995)	The melodic characters from bars 1-3 were a imitation to chromatic blues	The researching for desired attributions in the mental structures (Finke & Sayton, 1988)	None	Internal precursor to the final products (Ward, Smith & Finke, 1991:192)	None
The formation of simple associations amongst those structures (Mednick, 1962)	Melody in Bars 4-6	Potential functions of the structures (Finke, 1990)	None	Symbolic Visual patterns and diagrams (Finke & Slayton, 1988)	None
The combination of existing structures and formation of simple associations (Baughman & Mumford, 1995; Hampton, 1987; Murphy, 1988)	None	Evaluation of structures from different perspective (Barsalon, 1987; Smith, 1979)	None	Representation three-dimensional objects and froms (Finke, 1990)	None
The mental synthesis of new structures (Thompson & Klatzsy, 1978)	None	The interpretation of structures as representing possible solutions to problems (Shepard, 1978)	None	Mental blends of basic concepts (Hampton, 1987; Murphy, 1988)	The melody from bars 1 – 9 as a merger of concepts
The mental transformation of existing structures into new forms (Shepard & Feng, 1972)	Melody in Bars 7-9	Conceptual limitation that are suggested by the structures (Finke et al., 1992)	None	Exemplars of hypothetical categories (Ward, 1955, 1995)	None
Analogical transfer of information from one domain to another (Gentner, 1989; Holyoak & Thagard, 1995; Novivk, 1988)	None	Metaphorical implications of the structures (Ortony, 1979)	None	Mental models of conceptual systems (Johnson-Laird, 1983)	None
Systematic reduction reduced to more simpler version (Finke et al., 1992)	None			Verbal combinations of new associations and insights (Mednick, 1962)	None

Table 8.6: My second improvisation performance based on 'chromatic blues'

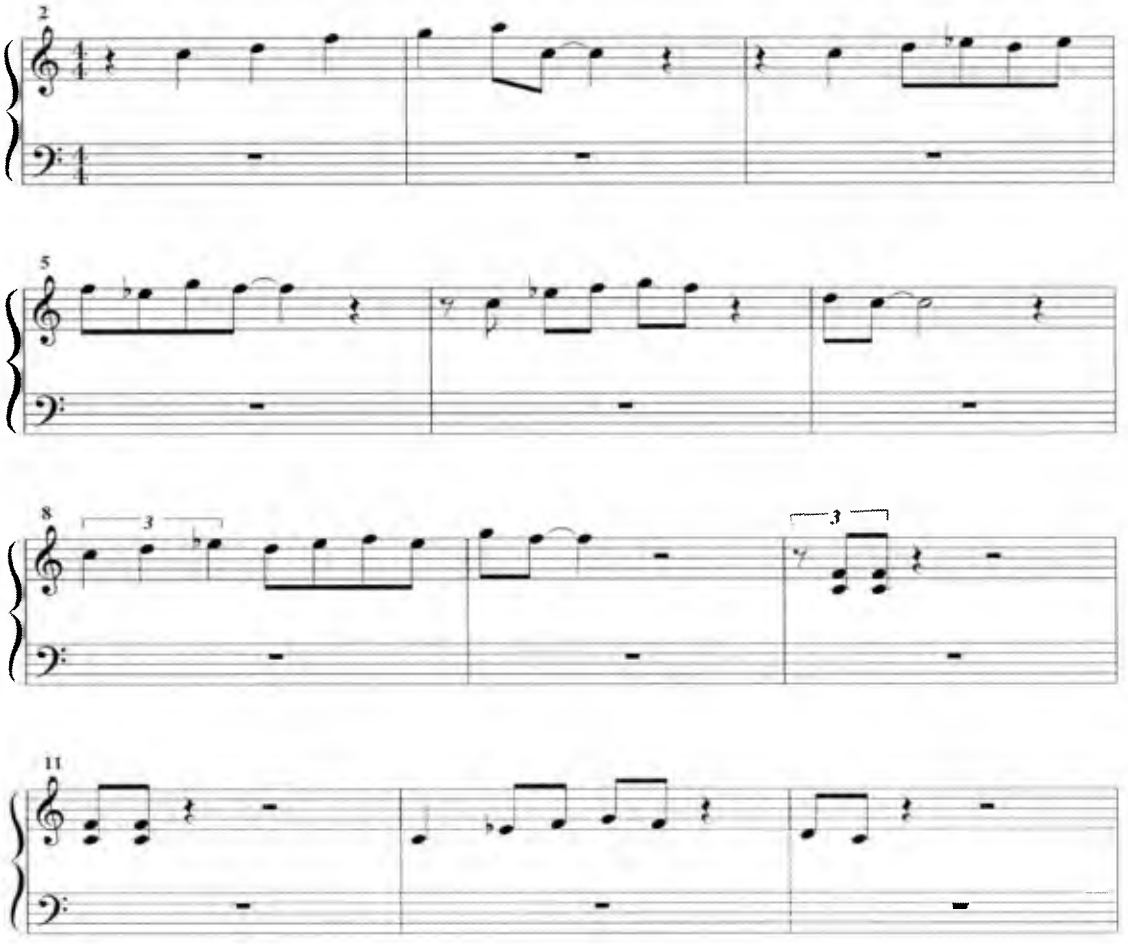


Figure 8.6: My twelfth improvisation performance based on 'chromatic blues'

The first three notes in bar 4 were identical to the opening phrase in 'chromatic blues'. The melody in the last two notes of bar 4 and the phrases in bars 5, 6, 7, 12 and 13 were the representation of formation that linked to the previous melody. The solo improvisation performance was also influenced by the exploratory process, as the melodic characteristics in the phrase of bars 8-11 represent as an interpretation of the existing musical structure in the chromatic blues which was the main musical feature in the creative process. The pre-inventive structure from this improvisation performance revealed a merger of basic musical concepts from the jazz piece 'chromatic blues'.

Generative Process Criteria	Solo Improvisation Performance	Exploratory Process Criteria	Solo Improvisation Performance	The Preinventive Structure Criteria	Solo Improvisation Performance
The retrieval of existing structures from memory (Perkins, 1981; Smith, 1995; Ward, 1995, 1995)	melodic feature in bars 2 and 3 and the first three notes in bar 4	The researching for desired attributions in the mental structures (Finke & Sayton, 1988)	none	Internal precursor to the final products (Ward, Smith & Finke, 1991:192)	none
The Formation of simple associations amongst those structures (Mednick, 1962)	the last two notes in bar 4 and the melodic phrase in bars 5, 6,7,12 and 13	Potential functions of the structures (Finke, 1990)	none	Symbolic visual patterns and diagrams (Finke & Slayton, 1988)	none
The combination of existing structures and formation of simple associations (Baughman & Mumford, 1995; Hampton, 1987; Murphy, 1988)	none	Evaluation of structures from different perspective (Barsalon, 1987; Smith, 1979)	none	Representation ofthree-dimensional objects and forms (Finke, 1990)	none
The mental synthesis of new structures (Thompson & Klatzsy, 1978)	none	The interpretation of structures as representing possible solutions to problems (Shepard, 1978)	melodic phrase in bars 8 -11	Mental blends of basic concepts (Hampton, 1987; Murphy, 1988)	Combination of fundamental melodic features
The mental transformation of existing structures into new forms (Shepard & Feng, 1972)	none	Conceptual limitation that are suggested by the structures (Finke et al., 1992)	none	Exemplars of hypothetical categories (Ward, 1955, 1995)	none
Analogical transfer of information from one domain to another (Gentner, 1989; Holyoak & Thagard, 1995; Novivk, 1988)	none	Metaphorical implications of the structures (Ortony, 1979)	none	Mental models of conceptual systems (Johnson-Laird, 1983)	none
Systematic reduction reduced to more simpler version (Finke et al., 1992)	none			Verbal combinations of new associations and insights (Mednick, 1962)	none

Table 8.7: My twelfth improvisation performance based on 'chromatic blues'

8.2.6 **Producing less original musical idea in classical genre**

However, comparing to the nature of my twelfth improvisation performance in both jazz and classical styles, my ability to generate new musical ideas was much stronger in the classical genre than in the jazz. The melodic and rhythmic characteristics in the music transcripts of figures 8.2 and 8.3 demonstrated a range of new musical features, which were completely divorced from the musical features of the given stimuli ' chromatic classical themes'. By contrast, the musical features of my twelfth attempt to improvise using the jazz piece in figures 8.5 and 8.6 still showed some degree of similarity in terms of melodic characteristics from the given stimuli 'chromatic blues'. This was caused by the fact that my level of performance experience and musical skills in term of improvisation were higher in the classical genre, I was able to produce more original musical ideas.

8.3 Duo Improvisation Performance

In the theme of duo improvisatory performance, the researcher analysed two particular issues. There was performance communication and the difficulties the musicians encountered when improvising as a duo. When improvising as a duo, there were several essential elements to consider which can be useful in creating a meaningful performance. Expert improvisers evaluated the improvisatory performance from conceptual ideologies rather than a technical perspective.

8.3.1 Expert takes charge of the melody line

Novice and expert improvisers differed in terms of their approach towards duo improvisation performance. The expert improviser seemed to take charge of the melody line. In the duo of a trumpet and a flute, the small group improvisation began with a simple melodic phrase from the trumpet as is shown from bars 1 to 2 in figure 1. The more experienced improviser the trumpeter continued to create improvisatory melodic lines from bars 4 to 9. The second melodic phrase from bars 3 to 6 was

complex compared to other melodies as it contained four different rhythmic characteristics.

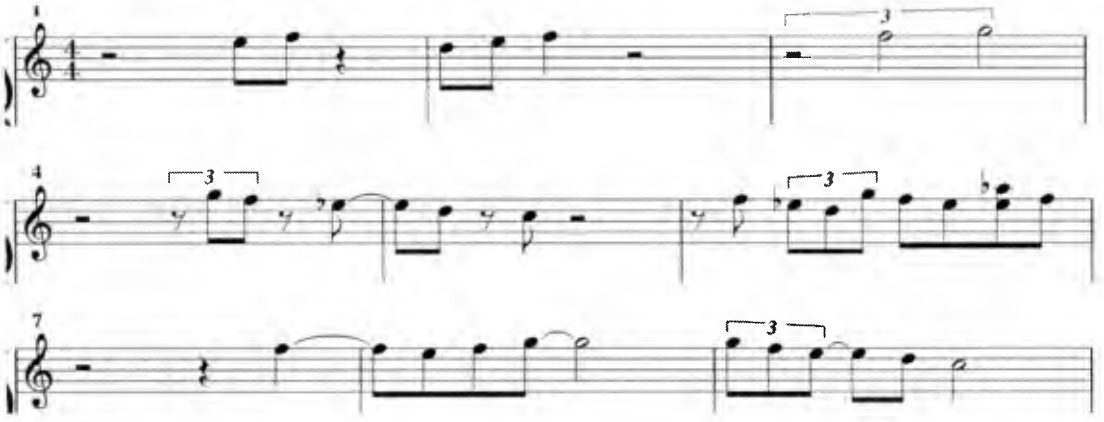


Figure 8.7 Duo improvisation performance in free style/ Expert part, bars 1-9

The expert began by seeking preferred musical features to build the structure into his duo improvisation performance and created a scale-like melodic phrase in bars 1-5. The second melodic phrase of bars 6-9 became the new interpretation of the previous phrase and was present as a prominent musical feature. Hence, the expert involved two different types of exploratory process in creating his duo improvisation performance. These two melodic phrases included from bars 1-9 were seen as the internal guideline to the entire performance.

8.3.2 Novice's improvisation acted as a supporting bass line

The novice improviser tended to improvise as the supporting bass line. Figure 8.8 shows the flautist's improvisation in a duo was much simpler in term of its rhythmic and melodic characteristics. It contained a range of random long notes, as the novice improvisation acted as a bass line chorus rather than a solo. These long notes provided a support to the trumpet part (see Figure 8.7). This melodic characteristic was the main melody until bar 12. For instance, the long note characteristic appeared in 11 out of total 12 bars.

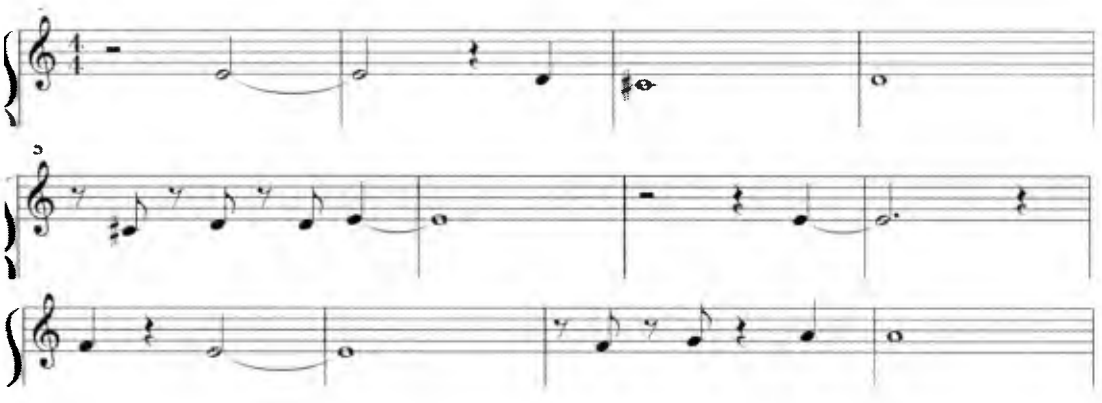


Figure 8.8 Novice part in duo free improvisation performance, bars 1- 12

The novice began the exploratory process by searching for attractive musical features to start her duo improvisation performance, as is shown in the melodic phrase of bars 1-4. It was followed by the retrieval of first melodic phrase in bars 1-4 as is shown in the first two notes of bar 5. The novice entered a second type of generative process by forming simple associations in order to link to the existing structures as it evident in the last two notes of bar 5 and continued into bar 6. At this stage, the influence of the creative process changed to the second exploratory phrase as the novice draw new interpretations of the existing musical features and produced a melodic phrase from bars 7-12. Hence, the overall evidence illustrates a mental merger of fundamental concepts introduced during the duo improvisation.

Generative Process Criteria	Duo Improvisation Performance	Exploratory Process Criteria	Duo Improvisation Performance	The Preinventive Structure Criteria	Duo Improvisation Performance
The retrieval of existing structures from memory (Perkins, 1981; Smith, 1995; Ward, 1995, 1995)	none	The researching for desired attributions in the mental structures (Finke & Sayton, 1988)	melody phrase from bars 1 - 5	Internal precursor to the final products (Ward, Smith & Finke, 1991:192)	melodic phrases from bars 1-9
The formation of simple associations amongst those structures (Mednick, 1962)	none	Potential functions of the structures (Finke, 1990)	none	Symbolic visual patterns and diagrams (Finke & Slayton, 1988)	none
The combination of existing structures and formation of simple associations (Baughman & Mumford, 1995; Hampton, 1987; Murphy, 1988)	none	Evaluation of structures from different perspective (Barsalon, 1987; Smith, 1979)	none	Representation of three-dimensional objects and forms (Finke, 1990)	none
The mental synthesis of new structures (Thompson & Klatzsy, 1978)	none	The interpretation of structures as representing possible solutions to problems (Shepard, 1978)	Melody phrase from 6-9	Mental blends of basic concepts (Hampton, 1987; Murphy, 1988)	none
The mental transformation of existing structures into new forms (Shepard & Feng, 1972)	none	Conceptual limitation that are suggested by the structures (Finke et al., 1992)	none	Exemplars of hypothetical categories (Ward, 1955, 1995)	none
Analogical transfer of information from one domain to another (Gentner, 1989; Holyoak & Thagard, 1995; Novivk, 1988)	none	Metaphorical implications of the structures (Ortony, 1979)	none	Mental models of conceptual systems (Johnson-Laird, 1983)	none
Systematic reduction reduced to more simpler version (Finke et al., 1992)	none			Verbal combinations of new associations and insights (Mednick, 1962)	none

Tables 8.8 and 8.9: Duo improvisation performance in free style/Expert's part, bars 1-19 and Novice part in duo X free improvisation performance, bars 1-12

Generative Process Criteria	Duo Improvisation Performance	Exploratory Process Criteria	Duo Improvisation Performance	The Preinventive Structure Criteria	Duo Improvisation Performance
The retrieval of existing structures from memory (Perkins, 1981; Smith, 1995; Ward, 1995, 1995)	melody line from last note of bar 9 and bar 10 and first not of bar 11 melody line in first two notes of bar 5	The researching for desired attributions in the mental structures (Finke & Sayton, 1988)	melody phrase from bars 1 -4	Internal percursor to the final products (Ward, Smith & Finke, 1991:192)	none
The formation of simple associations amongst those structures (Mednick, 1962)	melody line from last two notes of bar 5 melody line of bar 6 melody line of bar 7-8	Potential functions of the structures (Finke, 1990)	none	Symbolic visual patterns and diagrams (Finke & Slayton, 1988)	none
The combination of existing structures and formation of simple associations (Baughman & Mumford, 1995; Hampton, 1987; Murphy, 1988)	none	Evaluation of structures from different perspective (Barsalon, 1987; Smith, 1979)	none	Representation of three-dimensional objects and forms (Finke, 1990)	none
The mental synthesis of new structures (Thompson & Klatzsy, 1978)	none	The interpretation of structures as representing possible solutions to problems (Shepard, 1978)	melody phrase of bars 7 to 12	Mental blends of basic concepts (Hampton, 1987; Murphy, 1988)	combination of melodic concepts
The mental transformation of existing structures into new forms (Shepard & Feng, 1972)	none	Conceptual limitation that are suggested by the structures (Finke et al., 1992)	none	Exemplars of hypothetical categories (Ward, 1955, 1995)	none
Analogical transfer of information from one domain to another (Gentner, 1989; Holyoak & Thagard, 1995; Novivk, 1988)	none	Metaphorical implications of the structures (Ortony, 1979)	none	Mental models of conceptual systems (Johnson-Laird, 1983)	none
Systematic reduction reduced to more simpler version (Finke et al., 1992)	none			Verbal combinations of new associations and insights (Mednick, 1962)	none

8.4 Ensemble Improvisation Performance

The ensemble 'Fringe Magnetic' developed a range of scenarios during its group improvisation performance. They were duo improvisation in an ensemble, trio improvisation in an ensemble and individual solos. These performances differed in terms of levels of individual performance experiences and individual creativity.

8.4.1 Duo Improvising in an Ensemble

Expert Duo Listen to each other

In the ensemble 'Fringe Magnetic', there were combinations of expert and novice duos developed during the rehearsal. The more experienced duo of the group listened to each other when improvising as a group and was able to produce a harmonious question and answer like phrase. In Figure 8.9, the bass clarinet and violin duo improvisation developed four well-executed question and answer-like phrases from bars 1 to 7. The first phrase from bars 1 to 3 involved two parts from the violin and bass clarinet, each part was short and lasted one bar. The second phrase started at bar 4 and ended with bar 7. The violin part began to lead with a short phrase followed by the bass clarinet's improvisation.

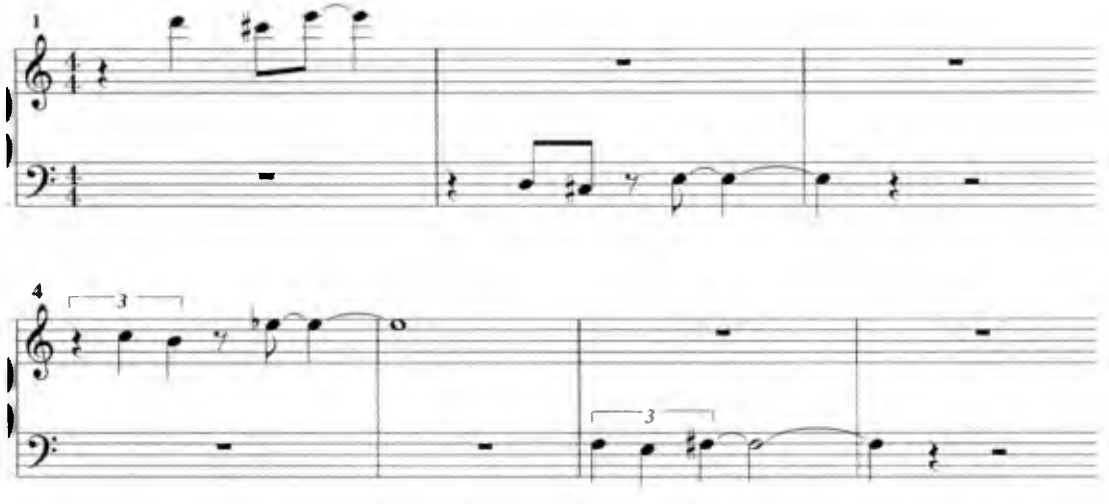


Figure 8.9 the bass clarinet and violin duo improvising, bars 1-7

The phrase from bars 8 to 11 showed that the bass clarinet and violin parts were matched closely to each others' individual style and phrasing. At the same time, the expert duo was also able to apply harmonic rules spontaneously so that the duo improvisation fitted in well with the chorus.

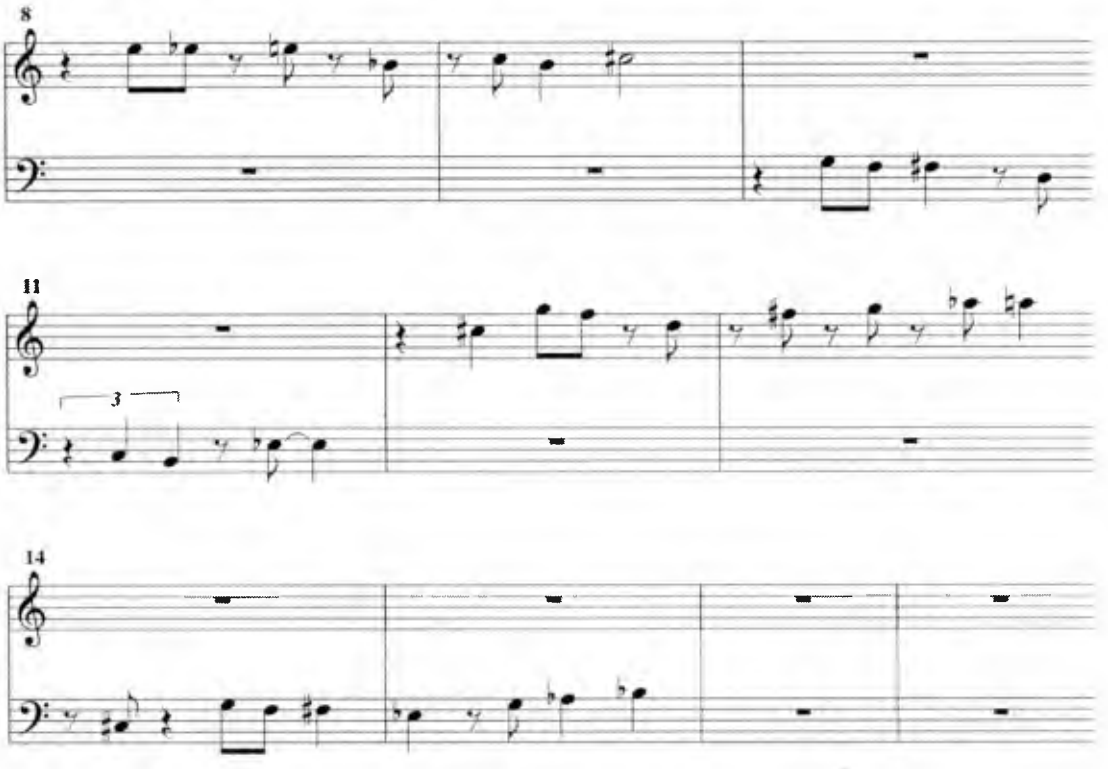


Figure 8.10 the bass clarinet and violin duo improvising, bars 8-15

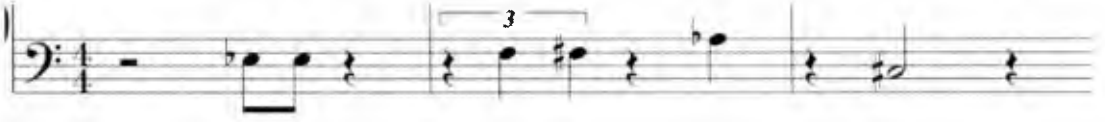
The bass clarinet and violin duo created the first melody from bars 1 to 7 as the search for a new musical feature. After the melody ended in bar 7, the improvisation was influenced by the generative process, as it formed a short musical phase to correlate to the previous melody. By the creation of the melody from bars 12-15, the duo began to produce novel musical features in their melody. Hence, this duo improvisation performance was influenced by both generative and exploratory processes (see Table 8.10 in the Appendix).

8.4.2 Trio improvising in an ensemble

The trios in the ensemble consisted of two experts and one novice improviser; therefore, there was no obvious division in terms of the level of performance experience. However, there were differences between novice and expert improvisers.

Expert created melodic phrases

The more experienced musician had more creative ideas in producing melodic phrases when improvising as a trio to a large ensemble. The example in Figures 8.14, 8.15 and 8.16 showed the three parts amongst bass clarinet, double bass and flute trio. Comparing the melodies in those figures, the bass clarinettist and the double bassist seemed to improvise more complex phrases than the flautist. For example, the bass clarinet's part in bars 1 to 3 was the first melodic phrase and it continue to develop by repeating the phrase for the second time from bars 5 to 7 (see Figure 8.11).



(First melodic phrase in bars 1-3)

(Repeating for the second time in bars 5-7)

Figure 8.11:Bars 1-3 and 5-7 of the bass clarinet's part

After the end of the first melodic phrase, the bass clarinettist continued to improvise the second melody from bars 8 to 10. The main musical feature in the first melody phrase included a triple rhythmic motif and chromaticism. The second ascending melody line had similar features to the first phrase is shown in the triple motif in the second beat of bar 9 (see Figure 8.12).

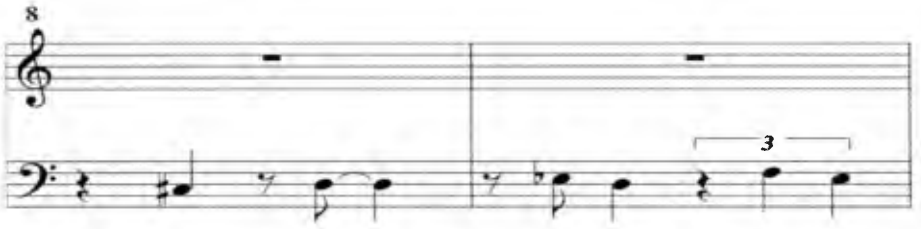
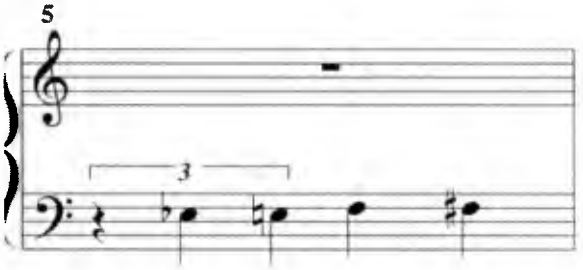


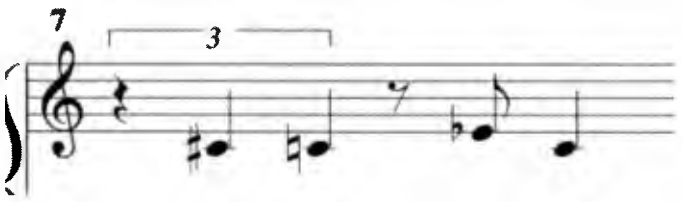
Figure 8.12 The bass clarinet's second ascending melody

Expert developed more complex melody line

The more experienced improviser seemed to develop more complex melody phrases in the trio improvisation. From the example of the double bass part in this performance, there were three complex melodic phrases from bars 1 to 11. The first phrase was the shortest of these thee melodies, the last phrase was the longest as it consisted five bars. The second phrase from bars 4 to 6 included combinations of rhythmic motifs. Comparing Figures 8.14, 8.15 and 8.16, the double bassist developed a more complex melody line than the flautist and bass clarinetist. In addition, there was a degree of imitation between the double bassist and bass clarinet's improvisation as the melody in bar 5 in Figure 8.11 was almost identical to the melody in bar 7 depicted in Figure 8.12. This meant that these two musicians were listening to each other while trio improvising (see Figure 8.13).



(Bass clarinet's melody in bar 5)



(Double bass' melody in bar 7)

Figure 8.13 A comparison of bass clarinet and double bass' melodies

Novice tended to improvise on long notes as a supporting accompaniment

The less experienced musician was more likely to produce long notes in the melody phrase than the experienced musician when the trio were improvising as a large ensemble. Comparing the double bassist and the bass clarinettist's examples in Figures 8.14 and 8.15, the flautist's improvisation was based on a series of long notes; this appeared to be a simpler improvisation.

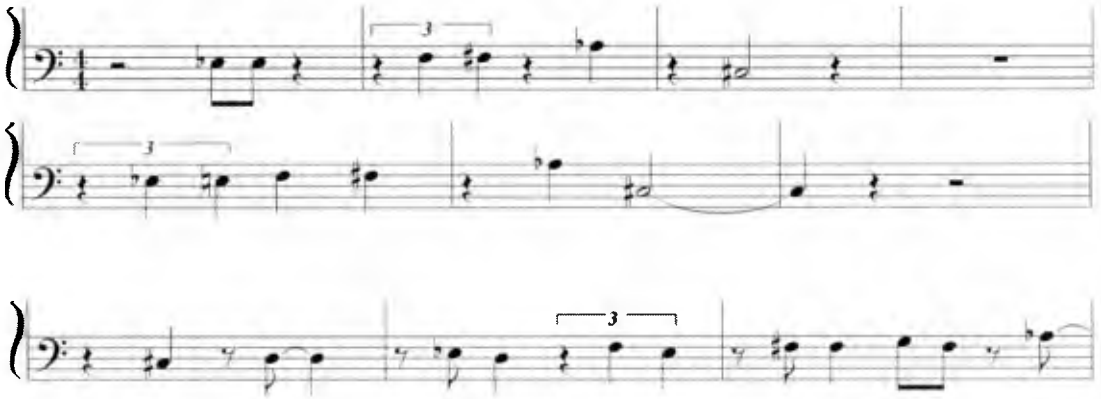
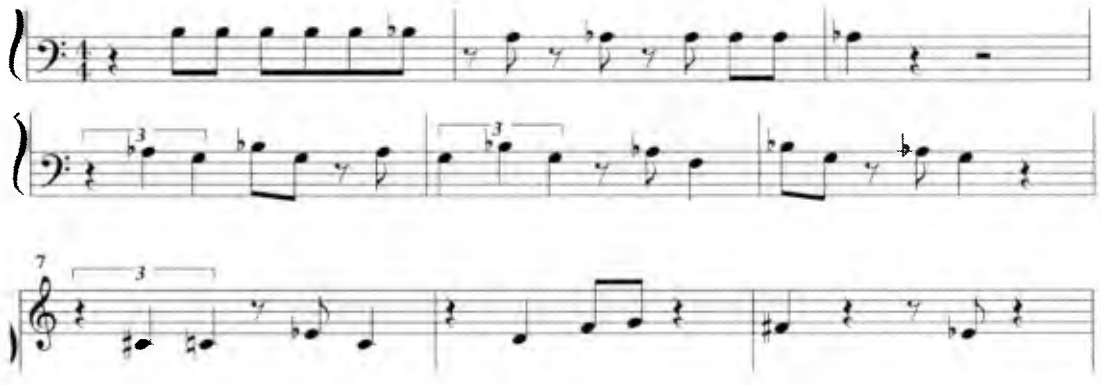


Figure 8.14 ensemble improvisation performance "Baron and Bump", the bass clarinet part



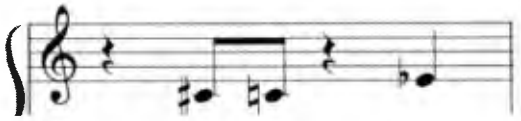


Figure 8.15 Ensemble improvisation performance' Baron and Bump', the double bass part

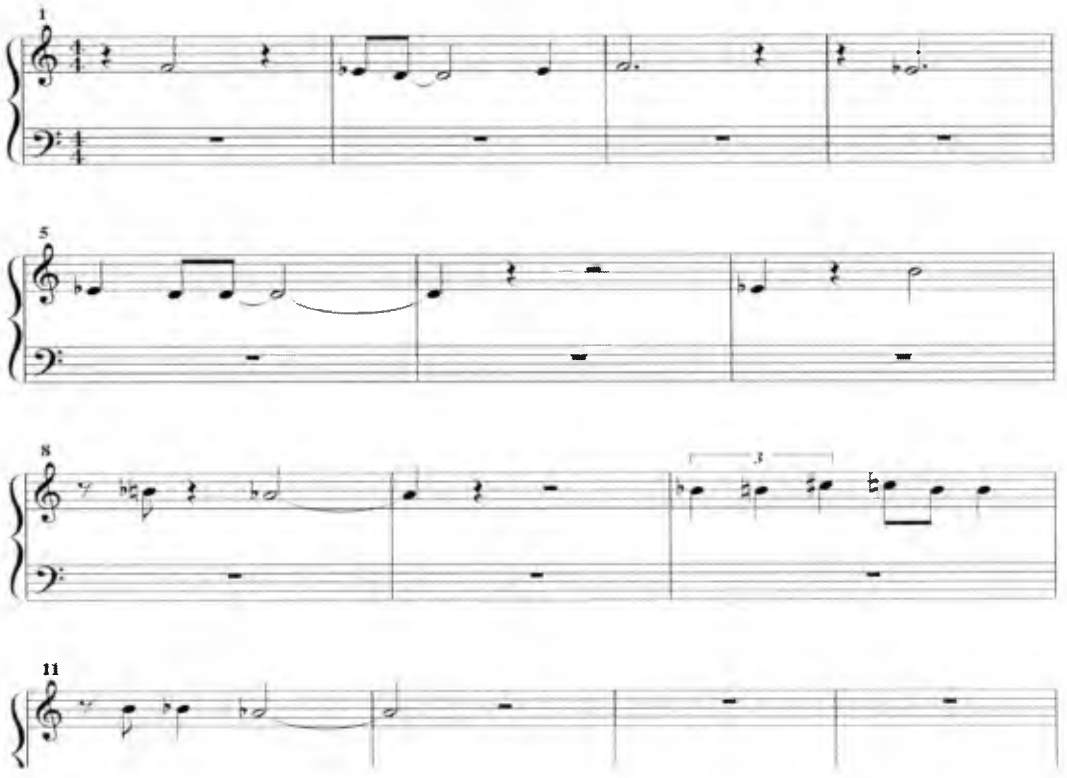


Figure 8.16 Ensemble free improvisation performance 'Baron and Bump', the flute part

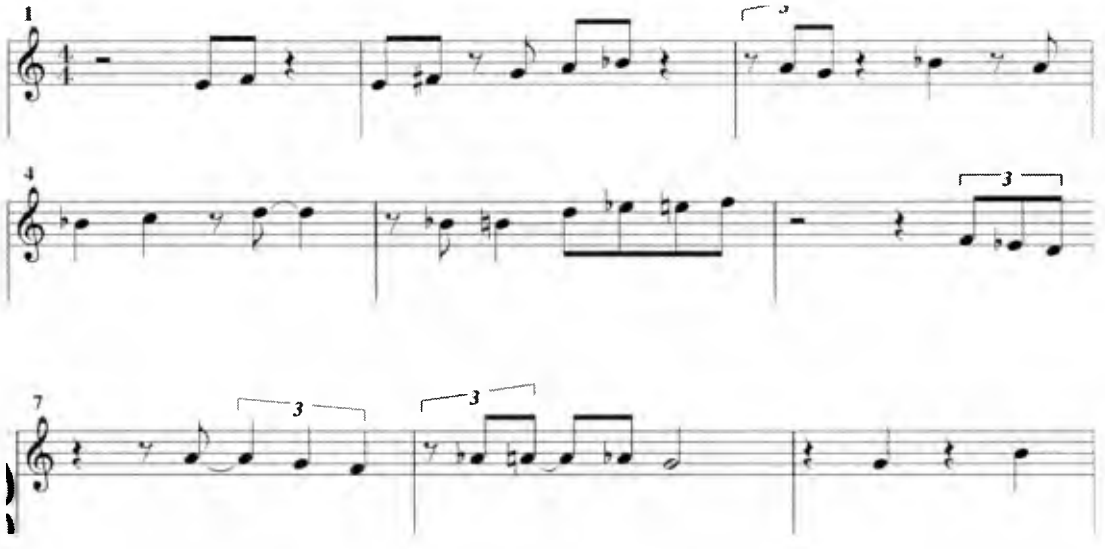
In this particular context, as the trio were improvising in an ensemble, the performance demonstrated that all three musicians spontaneously searched for a preferred musical feature as the opening phrase of their group improvisation. Hence, the trio was influenced by an exploratory phrase at the beginning of the performance. After the exploratory stage, the bass clarinet retrieved material from his first musical phrase and replicated the second melody in bars 4-7. A similar process occurred in the flautist' case as she also reproduced a melody in bars 4-6 from her memory. The double bassist also entered into a generative stage by transforming an existing melodic characteristic from the bass clarinet's part, as well as his from own musical phrase into a new melody in

bars 4-6. Furthermore, the double bassist was the first musician from the trio to begin to generate his pre-inventive structure in bar 7, whereas the less experienced improviser - the flautist - started her second generative phrase by formatting a short musical phrase to link to the previous musical structure. Meanwhile, the bass clarinettist began his pre-inventive structure by blending all the different types of musical features in bars 8-10. The flautist was the last of the trio to join in the process of generating her pre-inventive structure, which began in bar 10 (see Table 8.11 in the appendix).

8.4.3 Performing individual solo in an Ensemble

Expert generated more original musical idea

Performing individual solos to an ensemble was the hardest challenge. The example in Figure 8.17 shows a trumpet solo in the piece 'Baron and Bump'. Even though the solo was based on the musical piece, the melodic and rhythmic characteristics were completely divorced from the musical themes in 'Baron and Bump', however, the harmony structure was similar to 'Baron and Bump'. This meant that the expert improviser created a range of original musical ideas in his individual improvisation but he still operated within the given harmony structure.



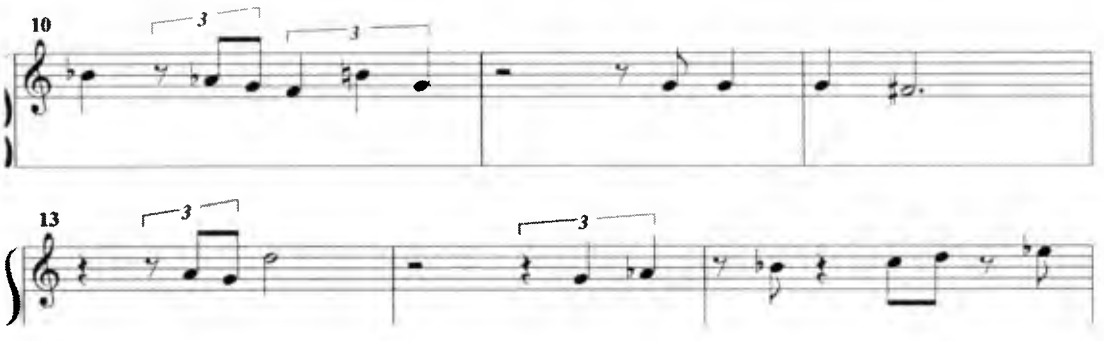


Figure 8.17 Trumpet soloing in Baron and Bump

The trumpeter expert began his first generative stage by producing a transformation of the existing harmonic structure into a new melodic phrase in bars 1-5. This was followed by the influence of the exploratory stage, as he created his second melody in bars 6-8 through the interpretation of the structure of his first melodic phrase. By the time, expert produced his third melodic phrase in bars 9-10, the influence of the creative process switched back to another generative stage as the expert retrieved the existing second melody from memory in order to create the third phrase. In the fourth melody phrase, the expert entered the exploratory process as he assessed the existing melody phrase. This then led the expert into the production of the pre-inventive structure as he created novel features in the fifth melody (see Table 8.12 in the appendix section).

Novice imitated from the given music themes

The less experienced improviser seemed to imitate from the given musical themes when performing as an individual solo to the ensemble. The example in Figure 8.18 demonstrates the beginning of a flute solo in the piece 'Round About'. The melodic characteristic from bars 1-15 were a close imitation to the musical themes in 'Round About'. The rhythmic development of the solo was much simpler compared to expert's solo in Figure 8.17.

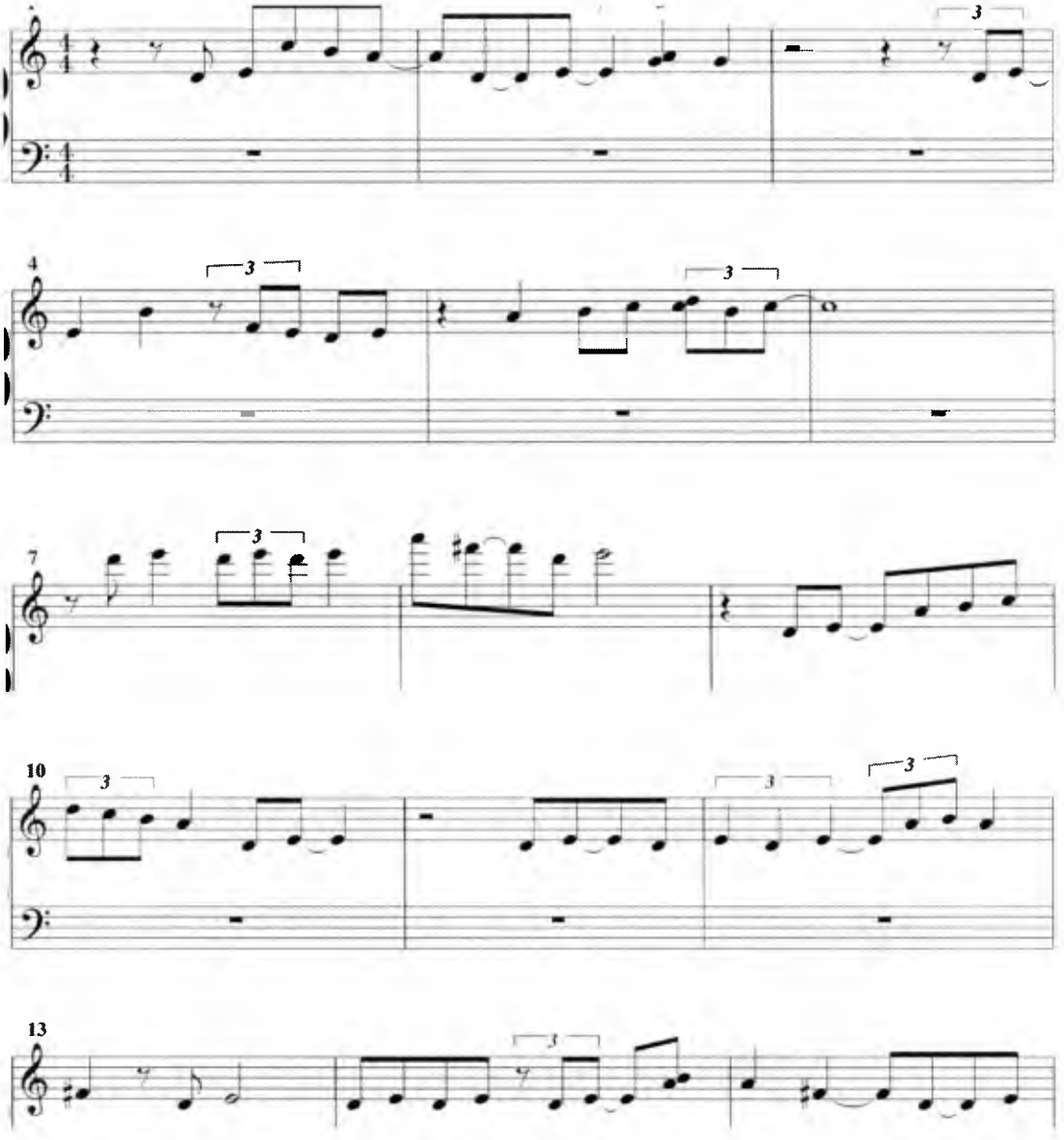


Figure 8.18 The flute soloing in 'Round About'

Figure 8.18 demonstrates that the novice combined existing melodic and rhythmic characteristics of the given musical themes 'Round About' and formulated the first two melodies from bars 1 to 6. The influence of the generative stage continued with the rest of the melodic phrases. Furthermore, the four melodic phrases from bars 7-15 were developed as a new transformation from the first two melodies. However, there was no

evidence found from the influence of the exploratory stage and the generation of the pre-inventive structure. Hence, the stages of the creative process in this performance remain at the generative process (see Table 8.13 in the appendix section).

8.5 Summary

My ability to produce individual creativity differed in the improvisation performance of both classical and jazz genres. The level of asserting individual creativity seemed to be lower in the improvisation performance based on the jazz piece 'Chromatic blues'.

Table 8.14 Comparison of the creative process in the first solo improvisation performance in classical and jazz

First individual improvisation performance	Generative Process	Exploratory Process	The Preinventive Structure	Creative process
Classical	Retrieval of bars 1-2 from 'chromatic classical' and replicate the first melody Producing connection to the first melody	The interpretation of the existing musical characters	Combination of existing musical ideas	Influence from both generative and exploratory process and also advanced to develop the preinventive structure as part of the mental structure
Jazz	No influence	The search for preferred musical features	No development	Influence only from exploratory process

I tended to imitate rather than create original musical ideas when I improvised in the jazz genre. After committing a period of practice time to individual improvisation in both classical and jazz genres, I generated less original musical ideas from the jazz piece 'Chromatic Blues' compared to the improvisation performance based on the classical piece 'Chromatic Classical Themes'. For example, a comparison of the solo improvisation performance in the classical and jazz genres during the learning process took a period of 12 weeks. Table 8.15 shows the classical improvisation performance

developed to a much higher level of creativity, as it created a new musical form and model. However, the performances of jazz focussed on melodic phrases and elements.

Table 8.15 Comparison of the creative process in the twelfth solo improvisation performance in classical and jazz

Twelfth individual improvisation performance	Generative Process	Exploratory Process	The Preinventive Structure	Creative process
Classical	Transformation of existing musical structures into new 'AB' form	The new 'AB' form as the interpretation of structure	The invented musical structure 'AB' form represented as a model of existing musical concepts	Influences from both generative and exploratory processes Also led to development of the preinventive structure
Jazz	Retrieval from memory Simple connection amongst the structure	Interpreting the existing musical ideas	Combining existing musical ideas	Influences from both generative and exploratory processes. In particular, there were two stages of generative process involved. There was also development in the preinventive structure

In addition, there were differences between the novices and experts in terms of the duo improvisation performance. The more experienced individual musician seemed to be in charge of the melodic improvisation when working as a duo. In contrast, the novice's improvisation acted as supporting the bass chorus. In terms of the creative process, the differences between the novice and expert lay in the number of stages of the generative process involved and the nature of the pre-inventive structure. For instance, in the case of the expert, there was no obvious influence from the generative process. When it reached the exploratory process, the expert developed two different stages, as is shown in Table 8.16. In contrast, the novice was influenced from the generative process onwards as she relied on her memory and created short and simple associations linking the structure in the performance.

Table 8.16 Comparison of expert and novice in duo improvisation performance

Duo Improvisation Performance	Generative Process	Exploratory Process	The Preinventive Structure	Creative process
Expert	No influence	The search for preferred musical features Interpreting the existing musical feature	Melodic phrase from bars 1-9 as the foundation to the final production	The influence was mainly from the two stages of the exploratory process. The product of these two exploratory phrases became the forerunner to the end product
Novice	From memory Formulating simple connection	The search for preferred musical features Interpreting the existing musical structure	Merging existing concepts	The creative process switched between exploratory and generative. Additionally two stages of generative process were involved before the combination of melodic concepts

The ensemble improvisatory performance group 'Fringe Magnetic' developed a range of scenarios during its group improvisation performance, such as duo improvisation, trio improvisation and the performing of individual solos. These variations of group improvisation performance differed in terms of different levels of individual performance experience and abilities at asserting individual creativity within a group context. For instance, when the duo was improvising as a group, the expert duo tended to listen to each other, whereas the novice duo was more homogenous in its improvising parts. The experts seemed to be able to develop complex melodic characteristics, whereas the novices tended to employ long musical notes when trio improvising to an ensemble. Furthermore, the experts also generated more original musical ideas when performing an individual solo in an ensemble, whereas the novices appeared to imitate more the given musical themes. Table 8.17 shows the difference in term of the influence from generative and exploratory processes. The expert constantly moved from generative and exploratory stages during the process and also led to the generation of a pre-inventive structure as the production of novel musical features. By

contrast, the novice's creative processes remained at the generative stage and did not advance to the exploratory process and the pre-inventive structure.

Table 8.17 Comparison of novice and expert in performing individual solos in an ensemble

Individual solos in an ensemble	Generative Process	Exploratory Process	The Preinventive Structure	Creative process
Expert	Transforming existing structures into new melodic phrases From memory	Mental assessment into new melodies interpreting existing music structure into new melodies	Producing novel musical features	The creative process were constantly moving from generative and exploratory phases which also led to the production of novel musical features
Novice	Coalescing existing musical feature into short and simple connection amongst the structure Transforming learnt structure into new melodic phrases	No influence	No development	The creative process remained at the stage of generative process

CHAPTER NINE:

DISCUSSION AND CONCLUSIONS

This research was inspired by a lifelong desire to discover the reasons for my relative lack of my musical improvisatory skill despite extensive training as a professional musician. This led me to investigate deeper issues in relation to learning to improvise, for example, the potential benefits of spontaneous musical creativity as an essential feature of learning music, raising awareness of possible diverse approaches of learning to improvise and last, but not least, to clarify any fundamental problems which educators can address.

The main research question addressed was:

How are improvisatory skills developed in individual and group contexts?

Subordinate questions were:

What strategies do expert and novice improvisers use when learning to improvise?

What factors influence with the development of strategies and skills in learning to improvise?

What are the relationships between memory and learning to improvise?

What effect does expertise in a different musical genre have on these developing skills?

9.1 What strategies do expert and novice improvisers use when learning to improvise?

Study 1 A self case study of an experienced classical musician learning to improvise using planned self-regulated practice and two matched music pieces representing classical and jazz genres

From the data derived from the self-case study, I as a novice improviser who had expertise in classical piano performance and depended mostly on my short-term working memory when improvising individually from a jazz piece (see section 5.9.2). The emphasis on short-term working memory appeared to be due to (i) my low level of domain knowledge acquisition and (ii) high level of performance anxiety in relation to learning to improvise to an unfamiliar genre. A similar outcome with improvisation was evidenced on a classical piece, even though the level of my knowledge acquisition and general domain familiarity was much higher within the classical genre. The main strategies that I adopted were (a) applying an analytic strategy during the improvisation process (see section 5.8) and (b) imitating elements from the given musical themes (see section 8.2.1). When comparing my solo improvisation strategies in both classical and

jazz music, I was able then to apply a wider range of relevant strategies with the classical music stimuli.

There has been little previous research investigating the novice improviser is their use of learning strategies while learning to improvise. The research of Sudnow (1978), who studied himself as an adult professional classical musician acquiring jazz improvisation skills, comes closest to my methodological approach. In this research, Sunow (1978) reported an applied strategy as 'frantic playing' where he had (in his terms) to give up cognitive control and let his hands to find the most appropriate notes instead. As a result, Sudnow (1978) concluded that experts do better in their own domain and that it is difficult to transfer skill development and knowledge acquisition between musical genres. In terms of the elementary stages of an improvisation learning process, Johnson-Laird (1988) suggested that, in the early stages of learning to improvise, processes draw on short-term memory in order to produce an acceptable improvisation of a more mechanical nature.

Sudnow's (1978) study and the present research differ in term of research methodology. Sudnow focused on jazz improvisation, whereas the present research applied different systematic methods, such as the use of planned self-regulated practice and tasks related to two matched music pieces (specially designed to have similar structures and musical design). The research was able to outline a greater detail of strategy application in relation to improvisation and also to link the effect of improvisatory performance

anxiety retrospectively. It also demonstrated the role of memory as an essential strategy for the novice's learning to improvise individually, especially in the early stage.

Study 2 Semi-structured interviews with novice and expert improvisers

The findings of the research suggest that expert and novice improvisers differ in the ways that they apply solo improvisation strategies. Expert improvisers apply various approaches, such as the following (see section 5.10.3):

- They recognize the importance of the harmonic structure;
- They acknowledge the importance of being able to play by ear;
- They are able to work efficiently within the perceived harmonic rules;
- They are able to use musical structures to develop coherent improvisation;
- They use a composing approach as an essential strategy;
- They are able to utilise domain knowledge automatically, retrieving it easily from long-term memory.

Many of these findings are supported by earlier research. As outlined in Chapter 2, researchers have looked at the learning process of the expert improviser and found, for example, that the jazz legend Charlie Parker applied systematic strategies in developing his solos by regular practice to acquire knowledge about the collective style of jazz improvisation in his time. According to the literature, there are specific and systematic strategies employed by experts when learning to improvise. Pressing (1988) explains that improvisations in jazz music traditions are rule governed, providing constraints for the musicians, as for instance in the harmonic structure from a specific song. This

consequently provides a boundary around a musician's creative choices, whilst giving the musician a framework within which to operate between several available and appropriate alternatives. The research sought to distinguish the type of strategy the expert applies and the reason behind its usage. For instance, the expert uses the musical structure in order to create a coherent improvisation. In the current research, experts report a strong link between composition and improvisation in their interview data.

Study 3 an experimental study: sight-reading, memorising and improvising as a duo

Analysis of the data from the semi-structured interviews and also the experimental study found several significant factors in the ways that expert improvisers from classical and jazz musical backgrounds engage in duo improvisation. The data suggest that the classical expert improviser was able to utilize both conscious and automated influences from contemporary music compositions when developing strategies for duo improvisation (see section 6.9.1). Timing was also an essential component of the expert, as provided a clear framework to improvise upon. The expert with a classical music background also evaluated - 'Talking about the Doing' - to review the process and the product during duo improvising (see section 6.9.1). The evaluation stage focused on issues such as the use of the harmonic rules, timing issues and the form of the music.

Experts from a jazz musical background employed identical strategies when learning to improvise as a duo, drawing on conscious and automated processing (see section 6.5.1) and timing (see section 6.5.2). Acquiring knowledge of collective musical styles proved to be an effective duo improvisation strategy for improvising in different musical

contexts (see section 6.4.5). The expert jazz improviser also applied a composing approach in the duo improvisation strategy (see section 6.5.5). In terms of musical structure in the duo improvisation performance, the jazz expert tended to take charge of the melody line (and also see section 8.3.10).

The data suggest that there were also differences amongst expert improvisers from classical and jazz musical backgrounds in terms of their strategy development in duo improvisation performance. These differences related to the nature of their acquired knowledge and the usage of a composing approach. The jazz experts worked with a much tighter set of constraints than those working within a classical genre. For the classical musician, the structures related to harmony and timing were less constrained than those used in 'traditional' jazz formats. Further, expert improvisers from classical and jazz backgrounds shared different views on the relationship between composition and improvisation. Classical improvisers expressed these two processes as separate components, whilst the jazz improvisers perceived them as a parallel creative practice.

Study 4 an observation and interview study of ensemble rehearsals and group improvisation in a multi-genre musical task

A range of improvisation strategies were used by the leader and individual group members of the ensemble 'Fringe Magnetic'. These were mainly concerned with the musical structure of the ensemble improvisation. Negotiating the structure was perceived to be an essential strategy for creating an effective ensemble improvisation performance (see section 7.7.1). It involved discussion of timing, the musical style, the

instrumentation and also performance evaluation. The issue of timing was applied as an indication of the underlying musical structure of the ensemble improvisation and served a similar purpose as evidenced in the duo improvisation. This provided the ensemble and individual group members with a clear framework within which to improvise. In addition, the ensemble leader and the individual members evaluated the planning of the group improvisation once the negotiations regarding the structure were completed. The novel context of having classical and jazz musicians working on a new work that included improvisation provided the opportunities to explore these issues.

It was possible to compare improvisation approaches in the duo as well as in the larger group ensemble. One of the novice improvisers tended to improvise in a supporting role when learning to improvise as part of a duo. For instance, the novice's music part contained a series of random long notes acting as a bass line chorus rather than a melodic phrase (see section 8.3.2). The characteristic of these random long notes appeared regularly during the improvisation, appearing in a total of 11 out 12 bars. It seemed to provide a support for the other music part in the duo. The other novice improviser, working in a more familiar genre, developed melodic phrases that were supported by the other member of the duo. This suggests that the development of an improvisational novice's skills relate to the musical genre and the nature of the relationship with the other performers, as well as the extent to which they are supported by the expert.

In a large group, the same novice's strategy in learning to improvise was evidenced in an ensemble as in duo. Long notes were used as a supporting accompaniment (see section 8.4.2). Compared to other musicians' improvisation, the novice flautist's improvisation tended to be much simpler in terms of melodic characteristics and rhythmic development. The novice improviser also employed a strategy based on imitation from the given musical themes when performing as a solo in an ensemble (see section 8.4.3). The current research suggests that there are likely to be similarities in a novice's improvisation strategies adopted for both small and large groups.

Overall, the findings demonstrated that improvising individually is a complex musical activity that requires a combination of multilevel skill development and strategy application. Six stages were found in my learning process as I acquired musical skills and domain knowledge acquisition. In particular, during the latter stages (4) and (5), strategies such as using memorisation and analytic skills were applied in learning to improvise individually using classical genre music stimuli. In terms of learning to improvise to an unfamiliar musical genre such as jazz, the novice learner such as myself seemed to depend solely on my short-term memory. In comparison, other fieldwork data suggest that the more experienced improvisers were found to apply a wider range of strategies when improvising individually, such as working with the perceived harmonic rules, an ability to adopt musical structures and also to apply a more conscious composing approach.

In term of learning to improvise as a duo, the more experienced improviser applied a range of strategies such as timing, an ability to acquire collective musical styles and utilise a composing approach. The evidence from the experimental studies demonstrated that expert improvisers use timing to outline the structure, such as in the duo improvisation. Furthermore, the more experienced improvisers had acquired an ability to work within and across musical styles. Additionally, the expert jazz improvisers reported the importance of acquiring a rich collection of the domain knowledge. They had developed vigorous analytical skills in processing sound and this knowledge was stored in long-term memory.

9.2 What factors influence the development of strategies and skills when learning to improvise?

Study 1 a self case study of an experienced classical musician learning to improvise using planned self-regulated practice and two matched music pieces representing classical and jazz genres

The case study demonstrated that the novice improviser experienced greater difficulties in learning to play and improvise on the jazz music piece 'Chromatic Blues' in terms of physiological adaptation, acquiring reading music skills, developing aural schemata and establishing a high level of automaticity (see sections 5.2 to 5.5). The lack of relevant domain knowledge in jazz and limited performance experience and skills in relation to this particular genre (see section 5.8) were clearly influential. The process of self-regulated learning to improvise in an unfamiliar genre meant that existing skills could

only be used at a more basic level than was the case with the classical music piece. In addition, the process created enormous anxiety (see section 5.9.2) that further interfered with the development of related musical skills as I had limited strategies for coping with the anxiety in real time. For me, musical skills and domain knowledge were not easily transferrable between different musical genres.

Study 3 an experimental study: sight-reading, memorising and improvising as a duo

In the small group context of the duos, the individual characteristics of the two group members influenced the process of improvisation (see section 6.7.2). The expert improvisers were more likely to take risks as part of their creative inspiration. When the other duo member appeared to be less adventurous and more limited in producing musical ideas, this had the effect of hindering the development of strategies in the expert's duo improvisation.

There has been limited research of duo improvisation previously, including the role of risk taking. However, as reported above, Sudnow (1978) in his self-reported study indicated that one of his more successful strategies was 'frantic playing'. This involved risk taking through giving up (in his term's) cognitive control, letting his hands find the notes instead. This risk taking strategy reportedly led Sudnow's improvisation to sound more like that of an experienced improviser. Hanna and Freeman (1989) suggest that homogeneity in a group is unlikely to encourage diversity, which in the current research could also result in a compromising of the degree of 'novel' elements in group improvisation. In addition, it could restrict the potential for a high level of spontaneous

musical creativity and lower the level of the musical reproduction based on mechanical variation and repeated routine. Further, Csikszentmihalyi (1991) suggested that where performance consists of flow states and risk taking, this could hold the key to achieving an optimal level of musical communication in improvisation. In addition, Barrett (2002) comments on a key characteristic of professional jazz improvisers being their display of 'provocative competence' (ibid: 139). Here, the musicians make a deliberate effort to break away from their habitual performance comfort zone in order to reach a higher level of musical creativity.

Comparing earlier studies of experts' characteristic 'risk taking' and the data derived from this study, a common theme emerges. Expert improvisers are able to shift from habitual creative performance practice, such as repeatedly using a familiar musical routine, in order to produce new musical ideas. The findings of the present study revealed that the more experienced improvisers believed that risk taking was fundamental to a higher level of group creativity (see table 9.1).

Having an appropriate self critical attitude assisted in reducing the difficulties in learning to improvise as a duo. For instance, the classically trained novice improviser demonstrated a wish to be a perfectionist during duo improvisation and this appeared to impact negatively on the learning process. Limited performance experience in relation to improvisation may also be a factor here (see section 6.6.2). A highly self-critical attitude may cause a high level of performance anxiety.

The current research found that in a small group such as a duo, the style of leadership could have a significant impact on the process and product of improvisation (see section 6.7.1). In learning to improvise as a duo, the more experienced improviser was more likely to be the leader. Two contrasting styles of leadership were shown by the participants, the supportive and the strong. The adoption of a supportive leadership style increased the quality of the duo improvisation, the expert providing a solid bass harmony, which led to a coherent musical structure. In contrast, a strong (in the sense of dominant) leadership style had a negative impact on the quality of the improvisation as it appeared to increase conflict between the participants and limited the musical choice of the group members by imposing restricted rules. The findings suggest that the style of leadership is an important factor in creating an effective organizational improvisation.

Table 9.1 A comparison of earlier research and the current study on the effect of 'risk taking' individual characteristics on the development of experts' improvisation strategy and skill

The individual characteristics	Sudnow (1978)	Hanna and Freeman (1989)	Csikszentmihalyi (1991)	Barrett (2002)	The current study
The influence of individual creative characteristics on the developing improvisation strategy and skills	The risk taking strategy evidenced 'frantic playing' as the more successful strategy	Homogeneity in individual and group could lead to music reproduction based on mechanical variation	How states and risk taking improve the level of musical communication in improvisation	'provocative competence'	Breaking away from habitual creative performance practice increases quality of improvisation

Previous research has demonstrated that member characteristics in duo performance groups range from conflictive to compromising (Murningham and Conlon, 1991). Moreover, supportive leadership researchers have referred to the sometime benefit of a "servant" leadership style. A directive leader can have a negative impact on improvisation if he or she imposes visible and obtrusive control upon the group (Greenleaf, 1977). The findings of the present research demonstrated that 'conflictive' small group characteristics and a 'strong' leadership style reduced the level of small group creativity.

Study 4 an observation and interview study of ensemble rehearsals and group improvisation in a multi-genre musical task

In the improvisation in the large group, a consistent and interactive influence between the musical structure, the social structure, and communicative behaviour was in evidence throughout the entire ensemble improvisation learning process. There was a significant break point during the sixth ensemble rehearsal session where changes occurred across all three elements. The ensemble reached a turning point in this session. The data suggest that group members moved to a higher level of group creativity. For instance, less instruction was needed from the ensemble leader, and the group began to achieve information flow in the improvisation (see section 7.3.10). These findings support the theoretical framework provided by Poole (1983).

Factors such the management of performance anxiety, the low level of prior performances experienced by some participants, their relevant musical skills and the

role of resources seemed to influence the development of strategies and musical skills in learning to improvise as an ensemble. Also, individuals applied diverse approaches to managing performance anxiety in the group context (see section 7.7.2). Specifically, the musicians playing in the ensemble showed how implicit and explicit approaches to managing performance anxiety could have a negative impact on ensemble improvisation and reduce the quality of the group improvisation performance. Limited research has been undertaken into the treatment of performance anxiety in relation to learning to improvise as a group. The findings of the management of individuals' performance anxiety support the findings of Cunha and colleagues' (2002) in that it can have a negative impact on the quality of improvisation. In addition, communicating sensitively as a group with reference to an individuals' performance anxiety can defuse tension and reclaim a harmonious working atmosphere in the group improvisation learning process.

The research revealed that a lower level of performance experience and skills amongst group members could reduce the level of group creativity (see section 7.7.2). In particular, the jazz-trained drummer experienced difficulties in adapting to complex notation, which resulted into a major meltdown during the ensemble rehearsals and reduced the level of group creativity. Past research has suggested that group improvisation performance can be restricted by the skills of the least able member (Bastien and Hostager, 1988; Hatch, 1999). The current study supported these findings.

The detailed analysis of the data showed that the participating musicians spent a considerable amount of time discussing and working on issues related to resources (see section 7.5.1). The musicians from the ensemble worked collectively as a group to increase flexibility in the usage of the resource, i.e. the given musical themes. For instance, at the beginning of the group improvisation, issues relating to resource allocation interfered with the development of strategies and skills in their group improvisation performance. Cunha and colleagues (2002) suggest that a flexible dimension in resources can help to increase the number of possible courses of action an organization can take. This study showed that use of resource could influence the more experienced improvisers' development of strategies and skills in relation to group improvisation, inflexibility of resource allocation preventing the maximisation of group creativity.

The style of leadership in the ensemble 'Fringe Magnetic' demonstrated the qualities of 'attentiveness' and 'sharing'. The leader of the group paid constant attention to the group's needs and emotional well being. This had a positive impact on producing a high quality of ensemble improvisation (see section 7.8.1). The leadership role was also shared to some extent between all the group members during the ensemble improvisation process, likely due to the complex nature of the musical themes on which the group improvisation was based. This sharing increased the quality of the group improvisation as it facilitated a more meaningful relationship between the leader and the individual members (see section 7.8.2). Previous research has shown that the leadership style of the group's formal leader can act as a moderator of improvisation

(Cunha et al, 2002). Researchers have referred to the supportive leadership as a "servant" leadership style (cf Greenleaf, 1977). MacDonald and Wilson (2005) report that it is essential for jazz musicians to develop group identity during the collaborative musical activities. The current study revealed a supportive leadership style where the leader facilitated the group improvisation process, in line with the findings of Cunha et al. (2002) and Greenlead (1977). In addition, the adoption of a rotating leadership, which was apparent in the ensemble 'Fringe Magnetic', appeared to increase the level of group creativity.

The study found a positive influence of the collateral structures within the ensemble. They seemed to create an environment which maximised opportunities for group improvisation. For instance, the composer, who was also the ensemble leader, tried to accommodate as many individual sounds from the ensemble as he could in the composition; hence, the intention was that both the novice and expert improvisers would find the environment safe and inspiring for group improvising. Collateral structures in the organizational configuration can also affect the quality of improvisation where members are free from formal practices and are able to adopt less canonical ones (Brown and Duguid, 1991). It was important to strike the right balance with the collateral structures of the ensemble. The ensemble leader, in particular, asserted his approach, breaking away from formal group performance practice by not imposing any strict rules and allowing for creative freedom. This seemed to be a significant element in the development of the strategies and skills adopted in this larger group context.

When the ensemble reached a more advanced level of the group learning process, the leader devoted most of his time and effort to developing information flow using a range of communication approaches (see section 7.6.2). Achieving 'information flow' seemed to be a rewarding experience for the musicians. When the level of information flow increased, it led to a higher level of creativity amongst the ensemble musicians. Information flow is an essential factor in producing effective improvisation as it can act as the centre of communication within the organizational improvisation (Orlikowski, 1996). The effect of information flow was a positive influence in the development of experts' strategies and skills in the large group context confirming earlier research.

The current research found that in a small group such as a duo, the style of leadership could have a significant impact on the process and product of improvisation (see section 6.7.1). In learning to improvise as a duo, the more experienced improviser was more likely to be the leader of the small group. Two contrasting styles of leadership were shown by the participants, the supportive and the strong. The adoption of a supportive leadership style increased the quality of the duo improvisation, the expert providing a solid bass harmony, which led to a coherent musical structure.

The strong leadership style had a negative impact on the quality of the improvisation as it increased conflict between the participants and limited the musical choice of the individual group member by imposing restricted rules. The findings suggest that the style of leadership is also essential in creating an effective organizational improvisation.

The findings of the present study suggested that musicians from a classical background did not effectively assert their individual creativity in the group context (see section 7.7.3). This may have been due to the nature of the particular music that they were required to perform, the predominance of jazz improvisers in the group and the size of the group itself, in addition to their limited performance experience and related musical skills (section 7.5.2).

Powers (1981) believes that larger size groups can diminish the distinction between routine behaviour and improvised behaviour. One novice improviser, a classical trained flautist, described how the large group inhibited her ability to improvise and expressed negative emotions in relation to the process which did not support her in developing relevant strategies and skills. This ineffectiveness reduced the level of creativity in the group improvisation.

Overall, the research suggests that particular factors influence the novice improvisers' development of strategies and skills in an individual context were unfamiliar physiological adaption, slow reading music skills, limited domain knowledge acquisition, high levels of performance anxiety and a low ability in dealing with performance anxiety. This research also has reported several factors that influence novice and expert improvisers' learning to improvise in small and large group contexts. Limited domain knowledge acquisition, expectations and the style of leadership could effect negatively on the development of a novice's strategies and skills in relation to learning to

improvise. For more experienced improviser, member characteristics could have impact on their developing strategies and skills. Regarding learning to improvise in a large group, factors that were reported to be significant to the development of less experienced improvisers' strategies and skills included the style of the 'grooves', their ability to assert individual creativity, large group size and limited performance performance experience and elated musical skills For expert improvisers, the management of an individuals' performance anxiety in a large group context was found to be influential to its developing improvisatory related strategies and skills.

9.3 What are the relationships between memory and learning to improvise?

Study 1 a self case study of an experienced classical musician learning to improvise using planned self-regulated practice and two matched music pieces representing classical and jazz genres

The novices relied on memorising to assist in the development of their improvisatory skills. In the individual case study, there was evidence of continuous activation of aural and kinaesthetic memory during self regulated learning sessions (see section 5.6). The role of memory was important for creating solo improvisation (see section 5.7). It seems that when a novice is learning to improvise, there is a process where fragments are initially memorised and then retrieved from long-term working memory to produce standard and somewhat mechanical-like solo improvisation. Various researchers have studied the relationship between memory and learning. However, there is limited

research on the role of memory as novices learn to improvise in an individual context. Johnson-Laird (1988) commented that, in the beginning stage of learning to improvise, short-term working memory is used to create basic mechanical improvisation. The current research focused on the less experienced learner from a classical music background and demonstrated the importance of aural and kinaesthetic memory in this process.

Study 2 Semi-structured interviews with novice and expert improvisers

The role of memory was essential in experts' reports of their individual improvisations. They reported awareness of different levels of memory activation (see section 5.10.2), particularly emphasising the importance of developing automaticity in long-term working memory. In order to be able to improvise effectively in a particular genre, the subconscious knowledge base processes need to be automated, so that the performer can access the relevant knowledge at the moment of creation. Berliner (1994:194) stated, "The larger and more complex the musical ideas artists initially conceive, the greater the power of musical memory and mental agility required to transform it." Pressing (1998) also suggests that the process of improvisation depends on long-term memory and the simulated activations of unconscious automatic processes with conscious cognitive processes. The present study demonstrated the role of memory in creating a high level of spontaneous individual creativity involving a complex combination of musical skills. Experts develop their skills in acquiring musical knowledge in collective styles and genres by embarking on systematic self-regulated

practice in order to maintain the capacity of their long-term memory and in order to be able to retrieve material automatically from this form of memory.

Study 3 an experimental study: sight-reading, memorising and improvising as a duo

In the experimental study of learning to improvise as a duo, the expert jazz improvisers commented on the importance of musical memory (see section 6.3.1). In particular, the capacity of long-term memory and short-term working memory were seen as being influential in the development of musical skills, practice behaviour and strategy application. Short musical phrases were created and memorised. Additionally, the expert improviser explained the importance of developing automaticity in memory and the commitment to attaining such skills. In improvising memory plays a crucial role in relation to harmony, melodic line and musical structure.

Study 4 an observation and interview study of ensemble rehearsals and group improvisation in a multi-genre musical task

In the large group context, the jazz experts relied on their existing knowledge to provide the foundation for producing creative ideas (see section 8.4.2 and 8.4.3). Table 8.11 suggested that the jazz clarinettist and trumpeter retrieved already learnt musical phrases during their improvisations. The novice improvisers also learned and retrieved material as the improvisation sessions progressed. Table 8.11 similarly demonstrated that the novice improviser, the classically trained flautist, created the melody in bars 4-6 in the generative stage of the improvisation and then retained this over time.

Overall, this research has reported that a less experienced improviser was likely to apply musical memory to store domain knowledge; and the capacity of short-term working memory was found to be significant in relation to learning to improvise in a individual context. Furthermore, the more expert improviser also reported the importance of musical memory in domain knowledge acquisition when learning to improvise individually. The experimental study data did not find any significant relationship between memory and learning to improvise amongst novice improvisers; whereas, for the expert improvisers, the role of memory was reported to be essential. Regarding to learning to improvise in a large group context, both the expert and novice improvisers recognised that memory was an essential foundation for producing creative ideas.

9.4 What effect does expertise in a different musical genre has on these developing skills?

Study 1 a self case study of an experienced classical musician learning to improvise using planned self-regulated practice and two matched music pieces representing classical and jazz genres

Already acquired expertise in a particular musical genre may have a negative impact on developing musical skills in another genre in relation to physiological adaption (see section 5.2.3), music reading skills (see section 5.3.3), difficulties in using aural feedback to develop schemata (see section 5.5.3), reducing the level of automaticity (see section 5.4.3), reducing the capacity of musical memory (see section 5.6.3) and producing a low level of individual creativity (see section 8.2) in relation to individual improvisation.

Musical skills and domain knowledge acquisition are not easily transferrable between different musical genres. Theoretically, the developments of musical skills and domain knowledge have been recognized as two separate components. Hallam (1995; 2001a; 2001b), for example, argues that the developments of skills and knowledge have a closely connected relationship and comments: 'knowledge based mental representations of appropriate outcomes are required to check for errors, to select possible strategies and monitor progress.' This research lends support to this. Limited domain knowledge hinders and slows the development of related skills.

Study 2 Semi-structured interviews with novice and expert improvisers

The present research revealed different practices relating to improvisation in relation to particular genres (see section 5.10.2). For instance, one organist reported that he found it difficult to memorise from notation. This was not viewed as important in his professional performance practice. It was not a skill hat he felt the need to acquire, so he did not spend time practising it and (as expertise theory would predict) he had not developed strong skills in the area. It was clear from each research context that the genre expertise of the performers had a major influence on the level to which automaticity had developed and if individuals were able to draw on knowledge held in long-term working memory (see section 5.10.2).

Study 3 an experimental study: sight-reading, memorising and improvising as a duo

The expert jazz improvisers participating in the duos had generally had some training in the classical genre so perhaps it is unsurprising that most of them were able to work in

both jazz and classical genres. The percentage accuracy of the expert jazz improvisers' memorisation and sight-reading performance in both classical and jazz genres was very similar (see sections 6.1.3 and 6.1.4). In the improvisation task, one expert jazz improviser was able to accommodate the limitations of the novice classical improvisers' domain knowledge in the jazz genre by creating a musical improvisation based on a classical music theme (see section 6.8.2). In contrast, the novice improviser working in an unfamiliar genre (jazz) produced only one simple idea that was sustained throughout the improvisation (see section 6.6.1).

Study 4 an observation and interview study of ensemble rehearsals and group improvisation in a multi-genre musical task

In the 10-piece ensemble, the effect of being an expert in one musical genre on learning to improvise in a group context using skills required for another genre included a reduction in the effectiveness of the application of existing musical skills and the ability to adapt to complex notations (see section 7.7.2). Previous research has demonstrated that experienced learners can have difficulties in transferring their skills and knowledge to another musical genre from the one in which they have a specialisation because their skills depend to some extent on relevant domain knowledge acquisition. Sudnow's (1978) study demonstrated how he, as an outstanding professional classical musician, experienced enormous difficulties and had to put in a great effort to become an expert in jazz improvisation. Experts perform best in their own domain; musical skills are not easily transferrable between different musical genres.

The novices playing in the large group who had little or no experience of improvisation experienced difficulties in asserting individual creativity (see section 7.7.2), even though the musical theme that the group improvisation was based upon used stylistic writing from both classical and jazz genres. In the case of one novice, the effect of expertise in a different musical genre caused considerably high levels of performance anxiety. This affected the development of improvisatory skills by inhibiting creativity.

Overall, this research has found several significant impacts which expertise in a different musical genre could have on developing improvisatory related skills. In relation to learning to improvise in an individual context, it created an unfamiliar physiological adaption, slowed down reading music skills, and limited use of auditory feedback. Additionally, it reduced the level of automaticity, the size of the capacity of musical memory and the development of individual creativity amongst the less experienced improvisers. In the case of the more experienced improvisers, it was reported that expertise in a different musical genre impacted on the development of automaticity in long-term musical memory. In terms of learning to improvise as a duo, no significant impact was found amongst the expert improvisers. Domain knowledge acquisition was found to be affected amongst the novice improvisers when improvising in a small group. Regarding to learning to improvise in a large musical ensemble, the research has reported that the less experienced improvisers' ability to assess the quality of their individual creativity was effected by the need to acquire expertise in a different musical genre. In the case of the more experienced improvisers, the ability to adapt to complex notation was found to be effected.

9.5 How are improvisatory skills developed in individuals and teams?

Study 1 a self case study of an experienced classical musician learning to improvise using planned self-regulated practice and two matched music pieces representing classical and jazz genres

The case study of self-regulated learning to improvise suggested that existing musical skills were reduced in effectiveness in the unfamiliar jazz genre. Physiological adaptations, music reading skills, the use of auditory feedback to create schemata, the level of automaticity and dealing with performance anxiety were all affected. The important role of memory in learning to improvise was supported. There was clear evidence that domain knowledge was important across a range of skills and that learning to improvise was easier in a familiar genre.

Six stages were identified in the self-regulated learning process (see chapter 5 sections 5.2 to 5.8). In Stage 1 I became familiar with the necessary physiological adaption and began to develop relevant domain knowledge. In Stage 2, I became efficient at reading the music and developed meaningful auditory schemata. In Stage 3, my skills and domain knowledge acquisition began to become automated. In Stage 4, I began to be able to improvise using a memorisation strategy. In Stage 5, I began to improvise using an analytic strategy and in Stage 6 I was able to improvise relatively coherently around a musical structure.

According to Kratus (1996), the development of expertise in musical improvisation includes a series of stages. The learner begins to explore in their playing and develops their skills during Stage 1. In Stage 2, the learner focuses on process but with no overall structure. When the learner reaches Stage 3, he or she will start to apply musical techniques into the playing. At Stage 4, the learner is able to produce better quality improvisation and improves on the technical controls of the performance. The improvisation becomes more structured when the learner reaches Stage 5. In Stage 6, the learner is able to assert their personal style, producing fluency and applying required collective musical styles in improvisation. Table 9.2 shows similarities and differences in the stages identified in the present research and Kratus's (1996) work, such as exploration in playing at the initial stage, applying musical techniques and strategy, and producing structure improvisation.

I, as a novice learner, tried to understand what I was required to learn and committed time and effort in developing relevant skills and knowledge during Stages 1 and 2. During Stage 3, I began to be able to monitor my learning progress and was able to learn from my mistakes. I learned more quickly as all the relevant skills and domain knowledge became automated. Even though my physiological adaption was accomplished earlier than my music reading skill, I still needed to continue physiological adaption to enable me to reach automaticity. During Stages 4 – 6, my individual creativity began to develop as I improvised using a combination of deeper level of approaches such as memorization and analytic strategies.

Table 9.2 Comparison of the learning stages in self case study and Kratus (1996) model

Stages	The present research	Kratus (1996)
Stage 1	Physiological adaption Domain knowledge	Exploration in Playing Musical skills
Stage 2	Reading music skill Auditory schemata	Focusing on process with no overall structure
Stage 3	Skills and domain knowledge reach automaticity	Apply musical techniques
Stage 4	Apply memorisation strategy	More fluid in improvisation More control on technique
Stage 5	Apply analytical strategy	Improvisation becomes more structured
Stage 6	Improvising coherently around a musical structure	Asserting personal style Producing fluency in improvisation Applying collective musical style

Bryan and Harter (1899) reportedly identified similar issues in research on performance improvement in telegraphy: 'only when all the necessary habits, high and low, have become automatic, does one rise into the freedom and speed of the expert" (p.357). As Lehmann and Gruber (2006) suggest, as one set of skills comes closer to automaticity,

others develop through the associative and cognitive stages. When a novice learns to improvise in an individual context, automaticity needs to develop in relation to all of the low and high level of skills.

In developing individual creativity in my solo improvisation performance in classical and jazz genres, I applied the strategy of imitating the given musical themes in the first performance of the classical piece, the 'Chromatic Classical Theme'. After a period of self-learning to improvise, the sense of musical structure improved significantly. The development of improvisation was affected by my expertise in a different musical genre. I had difficulty in switching to an unfamiliar musical genre and, although there was improvement over the period of time, I produced less original musical ideas when improvising on the jazz piece.

Study 2 Semi-structured interviews with novice and expert improvisers

The processes adopted by the expert improvisers highlighted the important role of memory in developing improvisatory skills and that existing domain knowledge may not be appropriate in a new genre, thus reducing the way that existing skills can be applied. The expert jazz improvisers believed that having the ability to be able to improvise individually was an essential musical skill and could broaden their relevant domain knowledge. For classical musicians, solo improvisation was seen as important only by the organists that were interviewed, as it was recognized as an essential professional requirement for those playing in religious contexts. For these organists, sight-reading skills were also essential. Being able to memorise from notation was not.

Study 3 an experimental study: sight-reading, memorising and improvising as a duo

In the small group improvisation, the role of the expert was crucial in determining the way that the novice could develop their skills. In one duo, the novice provided a supporting bass line that included random long notes because the improvisation was in an unfamiliar genre (jazz) and the expert adopted a dominant role. The novice improviser's limited domain knowledge acquisition was clearly a factor here. In the duos, the expert improvisers seemed to utilize conscious and automated influences from learned musical compositions. They used a sense of time/temporal cues or musical structure to provide a clear framework. A number of communication strategies were adopted by the experts when relating to other musicians, the audience and the wider environment. In addition, the evaluation strategy of 'talking about doing' was also reportedly used to review the process and the product, although the jazz expert was more concerned with acquiring a collective musical style. Individual characteristics and the nature of the relationships in the small group work also had an impact on the outcomes.

Study 4 an observation and interview study of ensemble rehearsals and group improvisation in a multi-genre musical task

In the large group improvisation, the same novice adopted a similar strategy using long notes as a supporting accompaniment. There was also evidence of imitating the given musical themes. While the experts were able to be in the 'groove', and assert their

individual creativity, the large group size and limited performance experience and related musical skills inhibited the novice's developing improvisatory skills and strategy.

In the large group improvisation a range of strategies were reported to be used by the leader and individual group members. There was interaction generated between musicians' engagement with the musical and social structures and allied communicative behaviour throughout the entire ensemble improvisation learning process. There was also a clear turning point where higher levels of creativity and coherence seemed to emerge, at least in this piece of music. The leadership of the group appeared to be crucial in facilitating the development of the group's improvisatory capacity. The cross-genre nature of the music and its structure, in theory, should have enabled all participants to make a similar contribution to the emerging improvisation. Interestingly, across the sessions, experts and novices tended to produce almost identical improvisations in each session, there was little further development once the initial ideas had been established. Furthermore, the initial ideas developed tended to be in the genre where the individual had the most existing expertise.

Overall, the present research has reported that existing musical skills were reduced in their effectiveness in the unfamiliar musical genre, such as jazz, when learning to improvise individually. More specifically, in the case of novice improviser such as myself, many different skills were affected, and learning to improvise in both new and existing genres appeared to follow a staged process. In terms of developing individual creativity, a novice improviser such as myself experienced more difficulty in an

unfamiliar musical genre when creating solo improvisation performance; less original musical ideas could be produced when improvising on the given jazz musical piece.

9.6 Limitations of the research

Study 1 a self case study of an experienced classical musician learning to improvise using planned self-regulated practice and two matched music pieces representing classical and jazz genres

The research purpose of the self case study was designed to be able to draw out a comprehensive picture of the complexity of improvisation related learning process and to provide an insightful understanding into individual learning strategies. Therefore, the data generated are relevant to provide insight into this individual, but may have limited transfer to other cases – although the pattern of reported case study development found support in previous literature.

Study 2 Semi-structured interviews with novice and expert improvisers

The methodological approach of semi-structured interviews with novice and expert improvisers was designed to 'prompt' the interviewer to explain clearly any misunderstanding question and provided the respondents to clarify their response. In the reality of the current research, the majority of the participants found it difficult to clarify their thoughts in relation to learning to improvise, due to the complex nature of its process. Consequently, only limited amount of data was relevant to the research questions and useful to the current research.

Study 3 an experimental study: sight-reading, memorising and improvising as a duo

The limitation of the experimental study was the challenge of striking the best balance between the interests of research and the self-esteem of the participants when sight-reading, memorising and improvising as a duo. In particular, during the third element of this study 'free duo improvisation', one of the participants suddenly lost confidence in completing the duo improvisation performance task. The researcher had to step in and explain again the purpose behind this study. This particular participant eventually completed the task after having been assured again by the researcher of absolute confidentially. As a result, unnecessary extra time and effort have spent during the execution of this study, but it was a demonstration of the potential vulnerability and degree of anxiety that performance can bring when an individual is put in a novel context. In addition, another limitation of this experimental study was the number of participants. The study only included four participants. Therefore, the nature of its data can best be presented through descriptive rather than inferential statistics. As such, the duos are further example of cases that are seen as part of the exploratory focus.

Study 4 an observation and interview study of ensemble rehearsals and group improvisation in a multi-genre musical task

The limitation of the methodology in Study 4 was the nature of the group interviews, which revealed difficulties in the accessibility of personal issues. This might have been caused by the group dynamics. In addition, it was more difficult to organise the coding of the data of group interviews than in individual interviews.

Overall

The current research has been based on relatively small numbers of participants, a case study of an individual learner, two duos (as another example of cases) and a large improvising group. Although there may be resultant limits in the extent to which the findings can be generalised, they offer insights in their own right into aspects of the improvisation process. There were relatively large individual differences in the participants' engagement with the various improvisation tasks. In any study considering cognition, there are difficulties in understanding individual thoughts. The process of communicating those thoughts to others can distort the actual thinking process and observation alone cannot establish beyond doubt any individual's thinking processes. This was particularly the case in the experimental study of learning to improvise in a large ensemble. It was particularly difficult to capture and identify sufficiently what was going on in the musicians' thinking in real time.

9.6.1 Applicability to another context

The 'Geneplore' model and improvisation performance in individuals and teams

The research adopted a 'Geneplore' model to identify differences in novice and expert improvisers' performance in relation to the generative and exploratory process involved in producing musical improvisatory performance. However, it was not an effective method for assessing the quality of the improvised performance.

The research reported here analyzed a range of selected improvisation performances from individuals and teams using criteria derived from the 'Geneplore model'. The selected performances were chosen to reflect significant changes ,such as those relating to time, the effect of musical genres and behavioural changes. This procedure aimed to establish the relationship between the existing 'Geneplore' model and the musical product of improvisation in individual and group contexts. The findings showed that my ability to be creative at an individual level differed depending on the focus genre, classical or jazz. The creative process involved in developing the performance based on the jazz piece was at much lower level, as the influences at the exploratory phrase were limited and did not enable further development in terms of the generation of a pre-inventive structure. Comparing my solo improvisation performance in classical and jazz genres over the period of 12 weeks practice indicated that the classical improvisation was developed to a much higher creative level, producing a new musical form. However, the improvisation of the jazz piece merely focused on melodic phrases and concepts.

In terms of the creative process in the duo improvisation performances, the differences between the novices and experts lay in the number of stages of generative process involvement and the nature of the pre-inventive structure. For example, in the case of the expert, there was no evident influence from the generative process. During the exploratory process, the expert improviser engaged in two different stages, searching for preferred musical features and creating new interpretations from the existing musical structure. In addition, there were differences in the creative process between

the novice and expert improvisers in their ensemble improvisation performance. The expert constantly moved between generative and exploratory stages that led to the generation of the pre-inventive structure and the production of novel musical features. In contrast, the novice's creative process remained at the generative stage and did not manage to advance to the exploratory process and the pre-inventive structure.

The 'Geneplore' model was useful in analyzing improvisation performance in individual and group contexts in a broad sense. However, there were limitations in this theoretical framework, as the criteria did not include sufficient detail to identify different levels of improvisation performance.

9.7 Implications for Music Education

This research demonstrates that the development of improvisation skills has a strong connection to the growth of musical expertise and creativity. Therefore post-graduate music courses should offer opportunities to develop improvisation skills as part of essential skills teaching. This would help music students to understand the strength and weakness of their existing musical skills and domain knowledge, as well as provide an opportunity to assert their individual creativity. This study also found that duo improvisation could be valuable in developing improvisation skills if the leadership strategy was appropriately supportive from the 'expert', allowing the duo to listen to each other, utilising their relevant domain knowledge and develop a sense of group

creativity. Modules might be based on duo performances, helping musicians to develop improvisation strategies and a deeper level of musicianship.

At undergraduate and graduate levels, the research offered important insights into the errors and difficulties that non jazz musicians may experience when asked to improvise, and implies that course designers responsible for leading music studies, such as 'jazz for non jazz specialist', should recognize and facilitate effective ways to overcome students' problems and likely anxiety. The study established the importance of information flow in jazz performance and of applying a range of effect communication strategies. Students of jazz studies have been offered coaching in performance and communication skills as an essential part of their courses. These could incorporate understanding of the importance of information flow.

The research has implications for students. It has offered a musical example of how improvisation can develop through combining different genres in cross genre compositions. Additionally, it has found that involving experts from different musical genres can influence the development of existing musical skills, domain knowledge acquisition and individual creativity. For music students who are interested in learning music from different genres and engaging in practical experiences of improvisation, the development of the experimental ensemble performance group 'Fringe Magnetic' illustrated some of the errors and difficulties that they might encounter. In addition, the findings from the study could also help classical specialist music students to be

aware of how to develop of improvisation skills in individual and group contexts and so to develop a higher level of relevant musical skills and strategies.

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Appendix 1: The interview questions (study 2)

How do musicians learn to improvise?

What is the learning process?

How long does the learning process take?

The Learning process during the training year – is this still continuing?

What do musicians do differently now compared with their past training and experiences?

What is the transformation for the learning process through past formal and informal learning?

Do Musicians improvise in different styles?

How do they feel when they improvise in a different style?

How do musicians learn to improvise in a different style?

What are musicians' emotions in learning to improvise in a different style?

What is the role of memory in learning to improvise?

Do musicians think that they need improvised memory skill to improvise?

If so, what kind of memory skill?

And what is the process of developing the memory skill?

Appendix 2: A sample of the semi-structured interview (study 2)

When I was young, there was a piano in the house so from very early on I remember any opportunity I had I would go to the piano and sited at it and just plan and explore sound not play anything particular, and then its was more formalized later on, about the age of 8, when My father decided that I should have piano lesson, or My grand mother decided I should have piano lessons.

Are they both musicians?

My grand mother was an organist. My father was a church organist. So there was that tradition in the family. And there is a cousin of my mothers' was also an organist. So we were very church orientated. So it wasn't inconsiderable that I would play the piano or so about age of 13, I started to have lessons on the organ with a local church organist, and the progress to another teacher eventually, and took the some associated exams in organ. And than I did the organ diplomat at the royal college of organists and than eventually did the fellowship.

And the fellowship exams it's very tough – it had three pieces you have to play like it sort of Bach pieces and the romantic pieces and a modern piece, then you had a series of keyboard skills to do first which is to play a piece from sight, of quite a complex piece. Then you have another piece you have not see before which you have to play this piece from different keys this piece was written in. It's transposing. Then you have a

score reading texts, which were set out in soprano, alto, tenor and bass clef, and you have to read that.

And then you have improvisation texts – you were given a motif, a short motif, and a short fragment of a tune, which you improvise on that for 3 or 4 minutes. So in many ways, that sort of reflected on what organists do. That very often in the context of church service in this country.

Can you tell me more about the service?

It's quite likely that in the church tradition that something happen in the service, you either play a little piece that was either was like what Bach did, a short piece of prelude or choral or the alt, and all the organists will improvise. This piece would be too short. You either extends the melody. You sung a Hymn little bite longer. Something the service needs that so organists by tradition, that was part of their skill or craft if you like. So it was not a strenuous thing to do. Whereas if you were trained as a classical pianists, then there will be no reason for me to improvise. Because classical pianists don't do that. Having said that of course they memorized pieces. In organists' tradition, they emphasis more on sight-reading cause the number of times you accompanied choir, there is more emphasis on sight-reading to then to developing memory skill.

Appendix 3: A sample of the group interview (study 4)

Q: After 5 rehearsals, in term of musical communication do you think you are all speaking the same language now?

Rory: Yap, I think we are starting to. What I have been doing on today's session was to prompt the cellist and bass player the direction of each piece. I felt that as the whole group the bond is getting stronger and stronger.

Dave:

I agreed. I think there is also a clearer sense of musical direction today. The most difficult thing to deal with was to make each session of the music flow smoothly.

Q: How was it for you, Natalie (the cellist?) As you have been the very first rehearsal and today's session, how do you feel about the whole process?

Natalie:

I do think there is stronger sense of group communication in today's rehearsal. This music is originally composed and it has so many different elements in it. Some parts are composed material and some are improvisatory sessions. It was hard to see the whole picture as one starts to rehearse with each other. Now I can begin to hear the whole thing together as one unity.

Rory:

What I also have been doing was to build a strong core circle with the group. It is

difficult to find time to rehearse with everyone at the same time. I have been going through the music with the 3 woodwind, piano and percussion in greater detail so that they are able to build a solid core centre to support the entire group. Whoever new coming in to play and easily to catch on.

Q: Due to circumstances, you have to have different musicians to cover for the string session for some of the rehearsals. How is that working out for you?

Rory:

As everyone is really busy those few months with other gigs and stuff, it is difficult sometimes to have everyone coming at the same time. So I have concentrated more in going through all the tricky sessions in the music and sorting out cuing from composed session of the music to free stuff. I have ended on doing a lot of that to accommodate all the different players we have been having. For the most of the rehearsals, I have to repeat things a lot of the time.

Ivo:

Yep – it was kind of tough to going through all.

Rory:

Really - was it hard for you from all these rehearsals?

Ivo:

Er..no.. I think you have to do it. But it will be nice to get ride of the music at some point… (It felt like he was going to say something but he decided not too)

Appendix 4: A sample of the content analysis (study 4)

Third Rehearsal11/04/2007 four –five pm [session C on the paper]

00 00 – 00 00 38: Music + non verbal communication
practicing the beginning of the Baron and Bump
cellist: [tapping the rhythm on the side of his cello]
violinst: [lightly shaking his head, taping his foot alternatively on the beat]

00 00 38 – 00 01 38:
Communication
Leader/composer talked to the clarinettist about section F in Baron and Bump
L: so that's actually F[section F], you and me, robin, player over the topfor the third time, [leader/composer demonstrated how the section go by singing]..the third time
Clarinetist:Do you sing as well?
Leader/composer: ya – I sing it.
B C: like the back up
L: Exactly

Band leader / composer first directed everyone to section B and then talked to cellist about an error he had made earlier
Leader/composer: let 's go from um [pause and looked at the score], let's go from B [section B], the grove from B..[he was pointing out the place of the error from the scored to cellist] there is actual one bit you were actually pushy.. [singing the section to demonstrate the rhythm]
V: That's B natural
L: Yes B natural
L: [singing the rhythm to everyone] gu gu la la la
L: 1 , 2 , 3 [rehearsal cues – counting everyone in]

00 0139 – 00 0148
music
practicing from section B

00 01 49-00 01 51
Music + Communication
L:Chance to play all that bar
00 02 02 – 00 02 03
music + communication
L: D! [rehearsal cue] [pull his hand and down – indicate]

00 02 04 – 00 02 31
music
sight-reading/practicing with the score

00 02 32 – 00 02 36
Music + Communication
L: B the second time! [rehearsal cues]

Appendix 5: Table 1 a sample of the content analysis

Table 1: The Second Rehearsal (00:00-05:00)		
The Events	**The Categories**	**Participants**
1 Ensemble Rehearsal 2 Ensemble Rehearsal 3 The leader talked to the group 4 Ensemble Rehearsal 5 Ensemble Rehearsal 6 The leader talked to the group 7 The group listened to the piano's part 8 Ensemble Rehearsal 9 Ensemble Rehearsal 10 The leader talked to the group 11 The leader talked to the group 12 The leader cued the group with hand gesture 13 The leader sung to demonstrate to a group member 14 Ensemble practice 15 Ensemble practice 16 The leader talked to the group 17 the leader sung the rhythm of the bass clarinet section to the group 18 The leader 's right hand went up and down to the indicate the beat 19 The leader talked to the group 20 The leader talked to the group 21 Ensemble practice 22 The leader talked to the group 23 The drummer made a comment to the leader 24 The leader talked to the group 25 The group members replied 25 The leader talked to the group 26 Ensemble practice 27 The leader got up to pick up sheets of music from his case to his standard 28 The leader talked to the group 29 The leader talked to the group 30 The clarinettist talked to the leader 31 The leader talked to the group 32 Ensemble practice 33The leader talked to the group 34 The leader talked to the drummer 35 Ensemble practice	M M C M M C Non verbal C.B M M C C Non verbal C.B Non verbal C.B M M C Non verbal C.B Non verbal C.B C C M C C C C C M Non verbal C.B C C C C M C C M	9 9 9 9 9 9 9 9 9 9 9 2 9 9 9 2 9 9 9 9 9 2 9 4 9 9 1 9 9 9 2 9 9 2 9

Appendix 6: Dairy account (study 4)

We have been meeting up regularly every week to discuss all kind of issues related to this project. They are arranging from music direction to ticket sale for the concerts. The arrangement between the composer and I is that he brings in the music and musicians and I bring in music promotion and event management. When I first started to talk to the composer about the idea doing such kind of music collaboration, we both wanted to put this out there to the world as an original performance, a musical fusion between classical and jazz improvisation.

2/2/2006

Given Rory instructions that not to give music to other musicians. Designing methods to recording individual behaviour in group rehearsals.

25/3-6/4/2006

Rory was to finish the compositions by 3/4/2006. Arranging the bio from the musicians. At the same time, working voluntary on the promotion for the performance, i.e. the performance date with the venue, flyer promotion.

5/April/2006

Today I went to see Curve performed at Ryan's Bar. The performance program consisted of five pieces. They have worked on this set of work for at least 6 months. However, Rory claimed that 80% was unplanned. One surprising outcome from this performance was from the Bass clarinettist. His improvisation / solo were exciting and

edgy. That was first time I ever understand about some jazz comments for wanting to break things, going for it. It was almost mind-blowing. Especially the rhythmic components and the sound he wanted to project he executed well and without any fuss. There was a real harmonious in this Curve set. They all worked fairly well together. Rory was the bandleader who has cues them in most of the time. The jazz fans they have are mostly their college friends, not from random strangers. Overall, I wasn't overly impressed with what they have done. Perhaps I was influenced by the previous RAM seminar experience. I have unconsciously developed high expectation for the group and taste for real musical moment.

7/April/2006

Talked to bandleader about the experimental tasks. He was not too happy about asking other musicians to participant due to his concerns for their reactions. He said 'the musicians might feel insulted.' Later on the bandleader also expressed the need of more rehearsal, which means more funding. The coming Sunday will be the date for the compositions to be paid.

21/April – 9/May/2006

Analyzing the music for the large group ensemble. Understand the form and harmonic progression

Appendix 7: Dairy account of group improvisation performance (study 4)

What I need to consider for the method of collecting the whole process:
Pre-rehearsal interviews, bio and expectation
Videoing the rehearsal session
Group interviews afterwards: communication, interactions, leadership
Individual questionnaire on abilities assessment, group music-making
Task measurement
(Run this through with Rory before hand)

First Rehearsal 11/4/2006
Pre Group Interviews – 20 minutes
After Group Interviews -1 hour
Abilities Assessment (n=5) – 20 minutes

Second Rehearsal 12/4/2006
Pre Interviews – 20 minutes
After Group Interviews – 1 hour
Abilities Assessment (n=5) – 1 hour

Preparation for Upgrading:
Literature review
Research Mapping and question
Pilot analysis on (1) Abilities assessment with Novice and Expert – tasks (2) Group Rehearsals and Performance (3) 20 attitude, abilities and background Interviews with classical and jazz experts

Logistic arrangement with group performance
The score of the music – analysis the style and structure and a interview with the composer (his creative journey)
All players' e-mail address
Date for the venues – 2 jazz venues and an art gallery
Promotions for the three performances
Art and Music collaborations with an artist (Mark Rowan-Hull) and contacting by e-mail to arrange meetings
Technology, borrowing digital cam recorder and a stand

Appendix 8: Table 2 the nature and length of each group rehearsal (study 4)

Session	Date	Session Purpose	Time (minutes)
1. 2. 3. 4. 5. 6. 7. 8. 9. 10.	10 Apr 11 Apr 12 Apr 13 Apr 14 Apr 16 Apr 6 May 14 May 8 Jun 14 Jun	Learning(1) Learning (1) Discussion (2) Technical (3) Technical (3) Technical (3) Rehearsal (4) Rehearsal (4) Rehearsal (4) Rehearsal (4)	58 62 61 62 59 58 56 53 77 34

Appendix 9: List of DVD contents

Ex 1 (5.2.2)	*Developing physiological adaptation in learning a jazz piece*
Ex 2 ((5.4.2)	*Developing reading music skills in learning a jazz piece*
Ex 3 (5.5.2)	*Developing the use of feedback in learning a jazz piece*
Ex 4 (5.7.2)	*Developing musical memory*
Ex 5 (5.10.1)	*A expert developing solo improvisation strategies in self-regulated learning*
Ex 6 (5.10.2)	*A novice developing solo improvisation strategies in self-regulated learning*
Ex 7 (5.10.3)	*The first solo improvisation performance based on 'chromatic classical themes'*
Ex 8 (5.10.3)	*The twelfth solo improvisation performance based on 'chromatic classical themes'*
Ex 9 (5.10.3)	*The first solo improvisation performance based on 'chromatic blues'*
Ex 10 (5.10.3)	*The twelfth solo improvisation performance based on 'chromatic blues'*
Ex 11 (6.2.2)	*Duo memorization strategy application: playing through and sensory motor patterns*
Ex 12 (6.2.2)	*Duo memorization strategy application: 'chunking' and combining strategies*
Ex 13 (6.2.3)	*Errors and Difficulties: memorizing from notation*
Ex 14 (6.3.2)	*The relationship between Sight-reading and improvising: sight-reading while improvising*
Ex 15 (6.4)	*Duo improvisation strategies: conscious and unconscious influence and timing*
Ex 16 (6.4)	*Duo improvisation strategies: dramaturgy and acquiring collective musical style*
Ex 17 (6.6.1)	*Errors and difficulties in learning to improvise as a duo: domain knowledge acquisition*
Ex 18 (6.6.1)	*The style of leadership: supportive*

Ex 19 (6.6.1)	*The style of leadership: strong*
Ex 20 (6.7.1)	*Performance communication: performance identity*
Ex 21 (7.3.2)	*The second ensemble rehearsal April 2006*
Ex 22 (7.3.2)	*The second ensemble rehearsal April 2006*
Ex 23 (7.3.2)	*The third ensemble rehearsal April 2006*
Ex 24 (7.3.2)	*The third ensemble rehearsal April 2006*
Ex 25 (7.3.2)	*The third ensemble rehearsal April 2006*
Ex 26 (7.3.2)	*The sixth ensemble rehearsal April 2006*
Ex 27 (7.3.2)	*The sixth ensemble rehearsal April 2006*
Ex 28(7.3.2)	*The 11th ensemble rehearsal May 2006*
Ex 29 (7.3.2)	*The 11th ensemble rehearsal May 2006*
Ex 30(7.5.1)	*Resource/ basic learning: interpretive phrasing*
Ex 31 (7.5.2)	*Resource: the style of the groove*
Ex 32(7.6.1)	*Information/ communication within the group: multi modal communication*
Ex 33(7.7.2)	*Organization configuration/ member characteristics: performance experiences and musical skills*
Ex 34(7.8.1)	*Leadership/ leadership style: attentive to group's need and emotional well being*
Ex 35(7.8.2)	*Leadership: sharing leadership*
Ex 36(7.9.1)	*Ensemble improvisation strategy/ negotiating the structure: free or pre planned*
Ex 37(7.9.1)	*Ensemble improvisation strategy/ negotiating the structure: evaluation*
Ex 38(7.10.1)	*Ensemble improvisation performance: duo improvising in an ensemble*

Appendix 10: The musical notation of the composition 'Tall stories' (study 4)